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## AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1852.

## PROCEEDINGS.

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## MINUTES OF MEETINGS.

## OF THE SOCIETY.

**January 7th, 1903.**—The meeting was called to order at 8.45 p. m., Henry B. Seaman, Director, in the chair; Charles Warren Hunt, Secretary; and present, also, 87 members and 14 guests.

The minutes of the meetings of December 3d and 17th, 1902, were approved as printed in the *Proceedings* for December, 1902.

The discussion on the topic "The Sanitary Disposal of Municipal Refuse" was continued by Messrs. George A. Soper, Theodore Horton, W. J. Baldwin, Charles B. Ball, M. N. Baker, H. de B. Parsons and Rudolph Hering.

Ballots were canvassed and the following candidates declared elected:

AS MEMBERS.

THOMAS HOOKER LOOMIS, Steubenville, Ohio.  
WILLIAM MARTIN, Bellevue, Pa.  
JOHN COLWELL NEALE, Pittsburg, Pa.

AS ASSOCIATE MEMBERS.

LEWIS EUGENE ASHBAUGH, Ames, Iowa.  
WILLIAM DURWARD CONNOR, New London, Conn.  
WILLIAM HASTINGS FERGUSON, Denver, Colo.  
GEORGE SHERMAN FROST, New York City.  
CHARLES ROMNEY HALL, Portland, Me.  
AUSTIN CURTIN HARPER, Norfolk, Va.  
FREDERICK WILLIAM SCHWIERS, New York City.  
JOHN EATON SHEPARDSON, New York City.  
SAMUEL PAYSON WALDRON, East Berlin, Conn.  
RALPH NORMAN WHEELER, New York City.

The Secretary announced the election of the following candidates by the Board of Direction on January 6th, 1903.

AS JUNIORS.

RICHARD ERWIN DOUGHERTY, New York City.  
WILLIAM DOLLISON FAUCETTE, Savannah, Ga.  
MAX FELDMAN, New York City.  
LANGDON PEARSE, Roxbury, Mass.  
WILLIAM EDWARD WILSON, Detroit, Mich.

Adjourned.

**January 21st, 1903.**—The minutes of this, the Annual Meeting, will be printed in the *Proceedings* for February, 1903.

OF THE BOARD OF DIRECTION.

(Abstract.)

**January 6th, 1903.**—8.35 P. M.—Director O'Rourke in the chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Briggs, Croes, Jackson, Knap, Pegram, Seaman and Wilgus.

The cases of members in arrears for dues were considered and acted upon.

Upon the recommendation of the Finance Committee, it was decided to pay Ten Thousand Dollars on January 15th, 1903, on account of the principal of the mortgage held by the Mutual Life Insurance Company on the Society House.



A draft of the report to the Board of Direction was presented, by the Special Committee appointed for that purpose, and adopted.

The report of the Committee to recommend the award of prizes for the year ending with the *Transactions*, July, 1902, was received, and the prizes awarded, in accordance with the recommendations of that report, as follows:

The Norman Medal to Paper No. 911, "Experiments at Detroit, Michigan, on the Effect of Curvature upon the Flow of Water in Pipes" by Gardner S. Williams, M. Am. Soc. C. E., Clarence W. Hubbell, Assoc. M. Am. Soc. C. E., and George H. Fenkell, Jun. Am. Soc. C. E.

The Thomas Fitch Rowland Prize to Paper No. 910, "Description of Coos Bay, Oregon, and the Improvement of Its Entrance by the Government," by William W. Harts, M. Am. Soc. C. E.

The following resignations were accepted: S. E. Barney, Assoc. M., Frederic V. Pitney, Assoc. M., Henry H. Shepard, Assoc. M., R. C. McKinney, Assoc., Mark Fergusson, Jun., Myron H. Lewis, Jun., George E. Nostrand, Jun., George R. Wadsworth, Jun.

Applications were considered and other routine business transacted.

Five candidates for Junior were elected.\*

Adjourned.

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\* See page 2.

## ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

## MEETINGS.

**Wednesday, February 4th, 1903.**—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and there will be an informal discussion on "The Preservation of Materials of Construction." It is not intended to confine this discussion to any particular material or method, but to invite exchange of opinion, based on experience, of practical methods of securing permanence in engineering structures of all types. Several members have already agreed to take part, and it is hoped that others will come prepared to speak, or will send written communications on the subject.

**Wednesday, February 18th, 1903.**—8.30 P. M.—At this meeting a paper by George S. Morison, Past-President, Am. Soc. C. E., entitled "The Panama Canal," will be presented for discussion. This paper is printed in this number of *Proceedings*.

**Wednesday, March 4th, 1903.**—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper by M. H. Gerry, Jr., Assoc. M. Am. Soc. C. E., entitled "A High-Voltage Power Transmission," will be presented for discussion. This paper is printed in this number of *Proceedings*.

## ANNUAL CONVENTION OF 1903.

The Thirty-fifth Annual Convention of the Society will be held at Asheville, N. C., during the week beginning June 8th, 1903.

# ANNUAL REPORT OF THE BOARD OF DIRECTION FOR THE YEAR ENDING DECEMBER 31st, 1902.

PRESENTED AT THE ANNUAL MEETING, JANUARY 21st, 1903.

The Board of Direction, in compliance with the Constitution of the Society, presents its report for the year ending December 31st, 1902.

## MEMBERSHIP.

The changes in membership are shown in the following table:

GRADE.	JAN. 1ST, 1902.			JAN. 1ST, 1903.			LOSSES.			ADDI- TIONS.		TOTALS.	
	Resident.	Non-Resident.	Total.	Resident.	Non-Resident.	Total.	Transfer. Resignation. Dropped.	Death.	Transfer.	Election.		Loss.	Gain.
Honorary Members.....	1	9	10	1	8	9						1	
Corresponding Members.....			2		2	2							
Members.....	246 1	222 1	508 2	312 1	263 1	575 2	1	1	2	24	238	27	94
Associate Members.....	161	451	612	192	522	714	25	5	2	3	435	35	137
Associates.....	38	73	111	43	76	119	2	1		3	42	6	14
Juniors.....	101	150	251	107	154	261	38	6	14		68	58	98
Fellows.....	9	25	34	10	23	33			1			1	
Totals.....	596 1	932 2	528	665 2	948 2	713	65 13	18 32	65	248	128	313	

\* 25 Associate Members and 3 Juniors.

† 2 Associates and 33 Juniors.

‡ 2 Juniors.

§ 1 Reinstatement.

|| 1 Reinstatement.

It will be seen that the net increase during the year was 185.

In the report of the Board for 1902, statistics of the yearly growth of the Society for thirty-two years were given, and it was pointed out that the rate of increase for the last few years was apparently not due to temporary conditions. The result of this year seems to emphasize this, the figures of the increase for the past four years being as follows:

1899—Net increase in total membership.....	103
1900 .. .. .	138
1901 .. .. .	191
1902 .. .. .	185

Total for the past four years..... 617

Average yearly increase for the past four years.... 154

Average yearly increase from 1869 to 1898, inclusive. 62

The total number of applications received during the year was 362.



Action taken by the Board has been as follows:

Passed to ballot as Members.....	109
Passed to ballot as Associate Members.....	140
Elected Associates.....	14
Elected Juniors.....	65
Total.....	328
Applications awaiting action.....	90

The losses by death reported during the year number 32. They are as follows:

Honorary Member: William Hasell Wilson.

Members: Edward Josiah Blake, Charles Edward Henry Campbell, Lorenzo Russell Clapp, Emilio Del Monte, William Durfee Gelette, Edmund Phillips Hannaford, Charles Fletcher Hillman, Arthur Stanley Hobby, Milton Grosvenor Howe, John Butler Johnson, Moritz Lassig, Charles Hazlehurst Latrobe, William Shattuck Lincoln, George Henry Mendell, James Ellison Mills, Henry Mitchell, Nathaniel Edwards Russell, Ira Alexander Shaler, Martinus Stixrud, Robert Henry Temple, William Van Slooten, Robert Atwell Way, Oscar F. Whitford, Joseph Miller Wilson.

Associate Members: Henry Lawrence Cleverdon, Reginald McKean, Kenneth Oake Plummer Reinholdt.

Associates: John Woodbridge Davis, Charles Edward Hamlin, Peter Milne.

Fellow: Nathaniel Cheney.

### LIBRARY.

The accessions to the Library during the year are shown in the following table:

#### ACCESSIONS DURING THE YEAR 1902.

	Bound Volumes.	Unbound Volumes.	Specifica- tions.	Maps, Pho- tographs and Drawings.	Total.
Donations—					
In answer to special requests.....	272	1 153	....	1	1 426
From publishers....	47	14	....	...	61
Eng. News Pub. Co.	24	148	25	...	197
In regular course...	214	1 047	3 070	306	4 637
Exchange of duplicates	322	368	....	...	690
By purchase.....	237	238	....	...	475
Total.....	1 116	2 968	3 095	307	7 486

In addition to the above, there have been received 489 duplicates, and 234 separate numbers to complete files of periodicals, neither of which can appear as accessions.

A comparison with the corresponding figures for last year shows that the growth of the Library in 1902 has exceeded that of 1901 (which was regarded as phenomenal) by 1 459 accessions.

The Library now contains:

Bound volumes.....	11 330
Unbound volumes.....	27 609
Specifications.....	5 658
Maps, photographs and drawings.....	3 000
Total.....	47 597

The total number of titles in the Library is 19 178.

During the year, 890 volumes have been bound, and 55 bound volumes which were duplicates were received and have replaced previously unbound volumes.

The following amounts have been expended upon the Library during the year:

Purchase of books, 475 volumes.....	\$1 224.87
Express charges, etc.....	99.90
Binding 890 volumes.....	931.25
Fixtures and supplies.....	207.29
Total.....	\$2 463.31

The value of the accessions to the Library during the year is as follows, each accession having been valued separately, as received:

7 011 Donations and exchanges (estimated value).....	\$2 822.41
475 Volumes purchased (cost).....	1 224.87
Binding 890 volumes.....	931.25
	<hr/>
	\$4 978.53

Owing to the rapid increase of the Library, and the accession of many new books, by purchase and otherwise, it has been decided to publish a second volume of the classified Catalogue, the first volume of which was published in 1900. This volume is now nearly all in type, and it is expected will be issued to all members in about a month.

For the first 45 years of the life of the Society the total number of accessions to the Library was 30 847, an average yearly addition of 685 volumes. About the close of 1897 the Library was moved into the new House. Since that time the average yearly addition has been 3 350 volumes, the total, as stated above, being now 47 597.

By the terms of the will of the late Herbert Steward, Assoc. Am. Soc. C. E. (who died March 4th, 1899), the Society has received, during

the year, \$1 940, and the Board has accepted this bequest under the terms of Mr. Steward's will, which were as follows:

"I give and bequeath to the American Society of Civil Engineers the sum of two thousand dollars, to be known as the Herbert Steward Library Fund. The fund shall be invested and utilized as the Board of Direction of said Society may elect, provided it shall secure a yearly income; which income shall be entirely expended each year for the purchase of books, maps, or apparatus suitable for the Library of said Society, or for the purpose of promulgating engineering information. I also give to said Society such technical books from my library as may be selected by the Secretary of the Society."

A gift of £10 was also received during the year from *Sir Benjamin Baker*, Hon. M. Am. Soc. C. E., for library purposes.

### PUBLICATIONS.

During the year the usual ten numbers of *Proceedings* have appeared, and three volumes of *Transactions*, instead of the usual two, have been published.

In the *Proceedings*, the list of references to current engineering literature has covered 51 pages, containing 2 614 classified references to 62 periodicals.

The demand for publications has been much greater than usual, subscriptions and sales during the year amounting to \$3 231.16.

The stock of the various publications of the Society, kept on hand for the convenience of members and others, now amounts to 119 850 copies, the actual cost of which to the Society has been \$13 904.42.

More than 3 200 volumes of *Transactions* have been bound, during the year, for members and others, in the standard half-morocco or cloth bindings.

### SUMMARY OF PUBLICATIONS FOR 1902.

	Number Issued.	Total Edition of Each.	Number of Pages.	Plates.	Cuts.
<i>Transactions</i> * .....	3	2 800 2 900 3 100	1 434	52	327
<i>Proceedings</i> * .....	10	3 000	1 266	40	141
Constitution and List of Members .....	1	3 200	237	....	....
Advertisements .....	10	3 000	108	....	....
Totals .....	....	....	3 045	92	468

\* Includes Indexes and Tables of Contents.



The cost of publications has been:

For Paper, Printing, Binding, etc., <i>Transactions</i> and <i>Proceedings</i> .....	\$8 211.14
For Plates and Cuts.....	957.56
For Boxes, Mailing Lists, Copyright and Sundry Expenses .....	231.50
For Commission on Advertisements.....	265.09
For 6 575 copies of Memoirs and Papers.....	734.61
For List of Members.....	909.33
Total.....	\$11 309.23
Deduct amount received for advertisements... \$1 807.50	
Deduct amount received for sale of publica- tions.....	3 231.76
	5 039.26
Net cost of Publications for 1902.....	\$6 269.97

Since publications were begun by the Society, 31 years ago, there have been published 49 volumes of *Transactions*, 28 volumes of *Proceedings* and 33 miscellaneous separate publications, consisting of Indexes, Catalogues, Lists of Members, etc. The total number of pages in these publications has been 42 099, an average yearly output of 1 358 pages.

Beginning with 1896, the system of publication was changed, and since that time *Proceedings* and *Transactions* have been issued separately.

For the 24 years, 1872-1895 (inclusive), there were issued 22 799 pages, a yearly average of 950 pages, and for the past 7 years the total issue has been 19 300 pages, an average of 2 757 pages per year.

## MEETINGS.

During the year 25 meetings have been held, as follows: At the Annual Meeting, 2; at the Annual Convention, 6; regular semi-monthly meetings, 17.

At these meetings there were presented 18 formal papers, 4 of which were illustrated with lantern slides; 7 topics for informal discussion, one of which was illustrated with lantern slides; and 8 illustrated lectures.

The Thirty-fourth Annual Convention was held at the Willard Hotel, Washington, D. C. There were registered at this Convention 343 members of the Society, in all grades, accompanied by 377 members of their families, and other guests. This was the most largely attended Convention of the Society ever held.

## MEDALS AND PRIZES.

For the year ending with the month of July, 1901, Prizes were awarded, as follows:

The Thomas Fitch Rowland Prize, to L. G. Montony, Assoc. M. Am. Soc. C. E., for his paper entitled "The Ninety-Sixth Street Power Station of the Metropolitan Street Railway Company, of New York City."

The Collingwood Prize for Juniors, to F. A. Kummer, Jun. Am. Soc. C. E., for his paper entitled "A Proposed Method for the Preservation of Timber."

No award of the Normal Medal was made.

## FINANCES.

An examination of the Secretary's statement of receipts and disbursements, and of the general balance sheet which accompanies it, will show the financial condition of the Society. During the year the sum of \$1 940 has been received from the Executors of the estate of the late Herbert Steward, Assoc. Am. Soc. C. E., this sum to be invested and the yearly proceeds to be used in the purchase of books, maps, or apparatus suitable for the library, or for the purpose of promulgating engineering information.

When, in 1895, the project for building a new house was under consideration, the total assets of the Society (omitting the estimated value of the Library, and of publications in stock) were about \$65 000. Making no allowance for increase in the value of the present property since it was purchased, the total assets now are about \$167 000.

In the report of the Board for the year 1898, it is stated that "the permanent loan has been fixed at \$85 000, which loan has been secured at a rate of  $4\frac{1}{4}$  per cent." The payment, on January 15th, 1903, of \$10 000 on the principal of the mortgage, which has been authorized by the Board, will reduce the debt to \$55 000, which is now carried at 4% interest. In other words, \$30 000 has been paid off in four years.

The reports of the Secretary and the Treasurer are appended.

By order of the Board of Direction,

CHAS. WARREN HUNT,

*Secretary.*

NEW YORK, January 6th, 1903.

GENERAL BALANCE SHEET, DECEMBER 31ST, 1902.  
ACCOMPANYING REPORT OF THE SECRETARY.

ASSETS.		LIABILITIES.	
Building and Lot (cost) .....	\$191 730.26	Dues for 1903, paid in advance.....	\$12 127.23
Furniture (cost) .....	15 664.30	Mortgage Debt .....	65 000.00
Publications on hand; inventoried value....	13 904.42	Funds invested in Society House and Lot, and Library .....	223 150.82
Library:			
Cash expended for Books, etc.	\$7 824.88		
Estimated Value of Donations .....	40 600.73		
Due from Members.....	\$3 456.26		
" Non-Members, for Publications.....	244.81		
" for Advertising .....	555.00		
Cash.....	4 256.07		
	26 297.39		
	<u>\$300 278.05</u>		<u>\$300 278.05</u>

NEW YORK, 19th January, 1903. — We have examined the books and accounts of the American Society of Civil Engineers, and certify that the foregoing Balance Sheet is in accordance therewith, as of 31st December, 1902; and, in our opinion, correctly states the condition of the Society's affairs as shewn by the books at that date.

MEXITES, ROBERTSON & Co.,

*Chartered Accountants.*



## REPORT OF THE SECRETARY, FOR THE

TO THE BOARD OF DIRECTION OF THE

GENTLEMEN.—I have the honor to present a statement of Re-  
December 31st, 1902. There is also presented a general balance sheet  
NEW YORK, January 6th, 1903.

## RECEIPTS.

Balance on hand December 31st, 1902, in Bank and Trust Company and in hands of the Treasurer.....		\$15 993.31
Entrance Fees.....	\$6 025.00	
Current Dues.....	30 786.47	
Past Dues.....	1 256.88	
Advance dues .....	12 127.23	
Certificates of Membership .....	197.47	
Badges.....	1 213.00	
Sales of Publications.....	3 231.76	
Advertisements.....	1 807.50	
Interest.....	307.35	
Compounding Dues.....	250.00	
Library.....	50.75	
Annual Meeting.....	223.00	
Binding .....	2 896.87	
Miscellaneous.....	156.57	
Herbert Steward Library Fund.....	1 940.00	
Caretaking.....	28.00	
	<hr/>	62 497.85

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\$78 491.16

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## YEAR ENDING DECEMBER 31st, 1902.

## AMERICAN SOCIETY OF CIVIL ENGINEERS.

Receipts and Disbursements for the fiscal year of the Society, ending showing the condition of the affairs of the Society.

Respectfully submitted,

CHAS. WARREN HUNT,

*Secretary.*

## DISBURSEMENTS.

Salaries of Officers.....	\$8 199.97	
Clerical Help.....	8 759.34	
Caretaking.....	1 852.23	
Publications.....	11 044.14	
Postage.....	3 354.08	
General Printing and Stationery.....	1 747.84	
Badges.....	975.20	
Certificates of Membership.....	117.80	
Binding.....	2 033.11	
Library.....	2 459.56	
Maintenance of House.....	334.71	
Heat, Light and Water.....	1 068.79	
Betterments.....	29.48	
Furniture.....	360.34	
Annual Meeting.....	785.30	
Convention.....	434.50	
Prizes.....	111.00	
Advertising Commission.....	265.09	
Interest and Insurance.....	2 700.00	
Petty Expenses.....	182.29	
Society House Loan.....	5 000.00	
Current Business.....	357.95	
Refunds.....	21.05	
		\$52 193.77
Balance on Hand December 31st, 1902:		
In Union Trust Company.....	\$24 562.41	
In Garfield National Bank.....	749.98	
In hands of Treasurer.....	985.00	
		26 297.39
		<u>\$78 491.16</u>

## REPORT OF THE TREASURER.

In compliance with the provision of the Constitution, the Treasurer presents the following report for the year ending December 31st, 1902:

Balance on hand December 31st, 1901 .....	\$15 993.31	
Receipts from current sources, January		
1st to December 31st, 1902. ....	\$60 509.35	
Received from Herbert Steward Library		
Fund.....	1 940.00	
Received from Sir Benjamin Baker...	48.50	
	<hr/>	62 497.85
Payment on audited vouchers for current business, January 1st to December 31st, 1902 .....	\$47 193.77	
Payment on principal of Bond and Mortgage.....	5 000.00	
Balance on hand December 31st, 1902:		
In Union Trust Com-		
pany .....	\$24 562.41	
In Garfield National		
Bank.....	749.98	
In hands of the Treas-		
urer.....	985.00	26 297.39
	<hr/>	<hr/>
	\$78 491.16	\$78 491.16
	<hr/>	<hr/>

Respectfully submitted,

JOSEPH M. KNAP,

*Treasurer, Am. Soc. C. E.*

NEW YORK, January 6th, 1903.



## ACCESSIONS TO THE LIBRARY.

From December 10th, 1902, to January 13th, 1903.

## DONATIONS.\*

## THE CIVIL ENGINEER'S POCKET-BOOK.

By John C. Trautwine. Revised by John C. Trautwine, Jr., and John C. Trautwine, 3d. Eighteenth Edition, Morocco, 7 x 4 ins., 1 079 pp., illus. New York, John Wiley & Sons, 1902. \$5.00. (Donated by John C. Trautwine, Jr., and John C. Trautwine, 3d.)

The preface states that in preparation for the eighteenth edition, this book, the first edition of which appeared thirty years ago, has undergone a far more extensive revision than at any other time. More than 370 pages of new matter have been added, and the new edition is larger, by about 100 pages, than its recent predecessors. The articles on arithmetic are considerably extended by the addition of new matter relating to interest, annuities, depreciation, etc. The conversion tables contain the equivalents of both English and metric units, and each of these in terms of the other. The new article on the location of the meridian is much more complete than its predecessors, and a new table of azimuths of Polaris, corresponding to different hour-angles, has been added. Among the important changes in this edition are those in the articles on Statics, on Beams, and on Trusses. These have been almost entirely rewritten and completely modernized. Under Trusses, modern methods of construction are explained, and several modern roofs and bridges are described and illustrated. The Contents are: Mathematics; Natural Phenomena; Mechanics; Force in Rigid Bodies; Strength of Materials; Hydrostatics; Hydraulics; Constructions, etc.; Water Supply; Test and Well Boring; Rock Drills; Traction, Animal Power; Trusses; Suspension Bridges; Rivets and Riveting; Railroads; Materials. There is an index of forty-one pages.

## ANCIENT AND MODERN ENGINEERING AND THE ISTHMIAN CANAL.

By William H. Burr, M. Am. Soc. C. E., M. Inst. C. E. Cloth, 9 x 6 ins., 15 + 473 pp., illus. New York, John Wiley & Sons, 1902. \$3.50. Postage or Express, 27 cents additional.

This book is the outcome of a course of six lectures delivered at the Cooper Union in the City of New York, in February and March, 1902, under the auspices of Columbia University. These lectures have been expanded for the purposes of publication. The half-tone illustrations, with scarcely an exception, have been prepared from photographs of the actual subjects illustrated. All such illustrations in Parts V and VI, devoted to the Nicaragua and Panama Canal Routes, are made from photographs at the various locations by members of the force of the Isthmian Canal Commission. The parts are: Ancient Civil Engineering Works; Bridges; Water-Works for Cities and Towns; Some Features of Railroad Engineering; The Nicaragua Route for a Ship-Canal; The Panama Route for a Ship-Canal.

## A TREATISE ON ROADS AND PAVEMENTS.

By Ira Osborn Baker, M. Am. Soc. C. E. Cloth, 9 x 6 ins., 8 + 655 pp., illus. New York, John Wiley & Sons, 1903. \$5.00.

The author states in the preface that the object of this book is to give a discussion, from the point of view of an engineer, of the principles involved in the construction of country roads and city pavements. The attempt has been made to show that the science of road making and maintenance is based upon well-established elementary principles, and that the art depends upon correct reasoning from the principles rather than in attempting to follow rules or methods of construction. In some cases practical experience has not yet determined the best method of procedure, and in these cases the conflicting views with the reasons for each are fully stated. Considerable space has been given to the economics and location of country roads and to the construction and maintenance of earth roads. The remainder of the book, the portion that considers roads having permanently hard surfaces, is based chiefly upon American experience. The Contents are: Part I. Country Roads. Road Economics; Road Location; Earth Roads; Gravel Roads; Broken-Stone Roads; Miscellaneous Roads; Equestrian Roads and Horse-Race Roads. Part II. Street Pavements. Pavement Economics; Street Design. Street Drainage; Curbs and Gutters; Pavement Foundations; Asphalt Pavements; Brick Pavements; Cobble-Stone Pavement; Stone Block Pavement; Wood Block Pavements; Comparison of Pavements; Sidewalks; Bicycle Paths and Race Tracks. There is an index of nine pages.

\* Unless otherwise specified, books in this list have been donated to the Library by the Publisher.

**POWER DISTRIBUTION FOR ELECTRIC RAILROADS.**

By Louis Bell. Third Edition, Revised and Enlarged. Cloth, 9 x 6 ins., 7 + 303 pp., illus. New York, Street Railway Publishing Company, 1900. \$2.50.

The preface states that this book is written in the hope that it may be of service to those whose daily work is concerned with the art of transportation, in which electrical traction is to-day so potent a factor. The author has endeavored to set forth the general principles of the distribution of electrical energy to moving motors, to describe the methods which experience has shown to be desirable in such work, and to point out the ways in which these principles and methods can be co-ordinated in every-day practice. For the most part, apparatus is too mutable to describe exhaustively, unless one is writing a history. The reader will therefore find little of such detail. The volume deals with principles and methods, and, consequently, the examples given in the first edition are, save in unimportant details, as typical of current practice in 1900 as they were in 1896. The chapter headings are: Fundamental Principles; The Return Circuit; Direct Feeding Systems; Special Methods of Distribution; Substations; Transmission of Power for Substations; Alternating Motors for Railway Work; Interurban and Cross Country Work; Fast and Heavy Railway Service.

**COMBUSTIBLES INDUSTRIELS.**

Houille, Pétrole, Lignite, Tourbe, Bois, Charbon de Bois, Agglomérés, Coke. Par Felix Colomer et Charles Lordier. Paper, 10 x 6½ ins., 565 pp., illus. Paris, Vve. Ch. Dunod, 1903. 19 fr. 50.

For each of the above named fuels, one will find in this work information on its physical and chemical properties, its method of preparation, its use in the various furnaces for stationary boilers, locomotives or ships, its conditions of purchase, etc. The Contents are: Houille—Définition et classification de la houille; Essais et analyse de la houille; Sortage de la houille; Lavage de la houille; Définition industrielle et achat de la houille; Emploi de la houille dans les foyers; Foyers spéciaux; Pétrole—Propriétés et analyse du pétrole; Emplois du pétrole; Brûleurs à pétrole; Lignite, Tourbe, Bois, Charbon de Bois; Agglomérés—Généralités sur les agglomérés; Outillage des usines à agglomérés; Appareils de compression; Coke—Définition et emploi du coke; Théorie de la carbonisation; Fours à coke; Récupération des sous-produits; Installation et prix de revient d'une usine de carbonisation. There is an index of thirty-five pages.

**A TEXT-BOOK ON FIELD ASTRONOMY FOR ENGINEERS.**

By George C. Comstock. Cloth, 9 x 6 ins., 10 + 202 pp., illus. New York, John Wiley & Son, 1902. \$2.50.

The author states in the preface that the present work is not designed for professional students of astronomy, but for another and larger class, found in technical colleges. For many years it has been the author's duty to teach to students of engineering the elements of practical astronomy, and the experience thus acquired has gradually produced the unconventional views that find expression in the present text, and which, to the author's mind, are justified by the following considerations: In the engineering curriculum, work in astronomy is a part of the technical and professional training of students who have no purpose to become astronomers. Under these circumstances it seems to be the duty of the instructor to select for presentation those parts of astronomical practice most closely related to the work of the future engineer, and, with reference to the narrow limits of time allotted the subject, to keep in the background many collateral matters that are of primary interest and importance to the student of astronomy as a science. The chapter headings are: Introductory; Co-ordinates; Time; Corrections of Co-ordinates; Rough Determinations; Approximate Determinations; Instruments; Accurate Determinations; The Transit Instrument; Bibliography; Orientation Tables. There is an index of two pages.

**METALLURGICAL LABORATORY NOTES.**

By Henry M. Howe. Cloth, 9 x 6 ins., 14 + 140 pp., illus. Boston Testing Laboratories, Boston, 1902. \$2.50.

The preface states that metallurgical laboratory instruction of the established type reproduces the industrial metallurgical processes, each as a whole, and with such fidelity to actual industrial practice as is attainable. This, which may be called "Applied Metallurgy," seems to the author to have inherent and very grave faults. In its place he has tried to work out a system of what may be called "Theoretical," or better, "Analytical Metallurgy," with the aim of teaching, not individual processes each as a whole, but the individual underlying principles each by itself. This he has tried to do by means of a series of distinct experiments, each testing directly one or more of these principles. With a few exceptions, all the experiments in this work have been carried out either in the metallurgical laboratory of the School of Mines of Columbia University, or earlier in the author's private laboratory, and either exactly in the form here given, or in a form of which the present is a slight modification. The tables at the end of the work are original here, except that of atomic weights, and also, except in a sense, that of melting points of silicates. The book is divided into the following groups: Squad Experiments

and Others for a Short Course in Metallurgy: Pyrometry and Calorimetry: Melting Points of Silicates, etc.; Properties of Refractory Materials: Iron and Steel: Non-Ferrous Metals. There is an index of ten pages.

#### THE PHYSICAL GEOGRAPHY OF NEW YORK STATE.

By Ralph S. Tarr. (With a Chapter on Climate by E. T. Turner.) Cloth, 9 x 6 ins., 13 + 397 pp., illus. New York, The Macmillan Company, 1902. \$3.50 net.

It is stated in the preface that at the request of the American Geographical Society in 1896 a series of articles on the Physical Geography of New York State was undertaken and the first number appeared in the *Bulletin* of the American Geographical Society, Vol. XXVIII, 1896. When these articles were begun, it was the author's intention to cover the subject in two or three numbers; but, after getting well into the task, it became evident that to cover the field with any fulness would require many more chapters than were originally planned, and, therefore, the series lengthened out to twelve numbers and was not finished until 1900. In the main, this book is a reprint of the articles as published in the *Bulletin*, but there has necessarily been a certain amount of revision, and many of the more important papers on the subject which have appeared since the original publication of the articles have been made use of, so that the bibliography has been brought down to date. The chapter headings are: General Physical Features; The Mountains of the State; Plains and Plateaus; The Influence of the Glacial Period upon Topography; The Rivers of New York; Lakes and Swamps; Origin of the Basins of the Great Lakes; Post-Glacial History of the Great Lakes; Niagara; The Shore Lines; The Climate of New York; Influence of Physiographic Features upon the Industrial Development of the State. There is an index of eight pages.

#### EXPERIENCES SUR LE TRAVAIL DES MACHINES-OUTILS.

Pour les Métaux. Par C. Codron. Paper, 11 x 9 ins., 2 + 267 pp., illus. Paris, Vve. Ch. Dunod, 1902. 12 fr. 50.

The preface states that while continuing the publication of the study on the work of machine-tools in the *Bulletin de la Société d'Encouragement pour l'Industrie Nationale*, the author has thought that it would be advantageous to bring out the first part for the public who are interested in mechanical arts. The Contents are: Meulage; Essais de meulage; Essais à vitesse variable; Tranchage; Tranchage du plomb, du cuivre, du fer, de l'acier; Emploi de deux tranches opposées; Coupe avec deux molettes; Essais de pénétration d'une molette; Coupe des tubes; Cisaillage; Essais de cisaillage à lames parallèles; Cisaillage avec lames obliques; Essais de cisaillage avec lames circulaires; Essais de cisailluse; Essais de cisaillage à vitesse variable; Poinçonnage; Formes des déboucheures; Essais divers de poinçonnage; Poinçons à tranchants multiples; Alésage de trous à la broche; Poinçonnage progressif; Essais de poinçonneuse; Essais de poinçonnage multiple; Poinçonnage sur épaisseurs multiples.

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## BY PURCHASE.

**Treatise on Wooden Trestle Bridges According to the Present Practice on American Railroads.** By Wolcott C. Foster. Third Revised and Enlarged Edition. New York, John Wiley & Sons; London, Chapman & Hall, 1902.

**The Practical Application of the Slide Valve and Link Motion to Stationary, Portable, Locomotive, and Marine Engines, with New and Simple Methods for Proportioning the Parts.** By William S. Auchincloss, M. Am. Soc. C. E. Fourteenth Edition, Revised. New York, D. Van Nostrand Company, 1901.

**Annual Report of the Signal Officer to the Secretary of War,** 1871, '73, '74. Washington, Government Printing Office, 1871-74.

**Army Meteorological Register for Twelve Years, from 1843 to 1854, Inclusive,** Compiled from Observations Made by the Officers of the Medical Department of the Army, at the Military Posts of the United States, Prepared under the Direction of Brevet Brigadier General Thomas Lawson, Surgeon General, United States Army. Washington, A. O. P. Nicholson, 1855.

**Topographical Drawing and Sketching, Including Applications of Photography.** By Henry A. Reed. Fourth Edition—Revised and Enlarged. 2 vol. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1897.

**Building Construction and Superintendence.** By F. E. Kidder. Part I, Fifth Edition. Part II, Fourth Edition. New York, William T. Comstock, 1902.

**Architects' and Builders' Pocket-Book of Mensuration, Geometry, Geometrical Problems, Trigonometrical Formulas and Tables, Strength and Stability of Foundations, Walls, Buttresses, Piers, Arches, Posts, Ties, Beams, Girders, Trusses, Floors, Roofs, etc.** In Addition to which is a Great Amount of Condensed Information: Statistics and Tables Relating to Carpentry, Masonry, Drainage, Painting and Glazing, Plumbing, Plastering, Roofing, Heating and Ventilation, Weights of Materials, Capacity and Dimensions of Noted Churches, Theatres, Domes, Towers, Spires, etc., with a Great Variety of Miscellaneous Information. By Frank E. Kidder. Thirteenth Edition, Revised and Greatly Enlarged. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1902.

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## MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(December 10th, 1902 to January 13th, 1903.)

NOTE. — This list is published for the purpose of placing before the members of the Society the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.

### LIST OF PUBLICATIONS.

In the subjoined list of articles references are given by the number prefixed to each journal in this list.

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| <p>(1) <i>Journal, Assoc. Eng. Soc.</i>, 257 South Fourth St., Philadelphia, Pa., 30c.</p> <p>(2) <i>Proceedings, Eng. Club of Phila.</i>, 1122 Girard St., Philadelphia, Pa.</p> <p>(3) <i>Journal, Franklin Inst.</i>, Philadelphia, Pa., 50c.</p> <p>(4) <i>Journal, Western Soc. of Engrs.</i>, Monadnock Block, Chicago, Ill.</p> <p>(5) <i>Transactions, Can. Soc. C. E.</i>, Montreal, Que., Canada.</p> <p>(6) <i>School of Mines Quarterly</i>, Columbia Univ., New York City, 50c.</p> <p>(7) <i>Technology Quarterly</i>, Mass. Inst. Tech., Boston, Mass., 75c.</p> <p>(8) <i>Stevens Institute Indicator</i>, Stevens Inst., Hoboken, N. J., 50c.</p> <p>(9) <i>Engineering Magazine</i>, New York City, 25c.</p> <p>(10) <i>Cassier's Magazine</i>, New York City, 25c.</p> <p>(11) <i>Engineering</i> (London), W. H. Wiley, New York City, 25c.</p> <p>(12) <i>The Engineer</i> (London), International News Co., New York City, 35c.</p> <p>(13) <i>Engineering News</i>, New York City, 15c.</p> <p>(14) <i>The Engineering Record</i>, New York City, 12c.</p> <p>(15) <i>Railroad Gazette</i>, New York City, 10c.</p> <p>(16) <i>Engineering and Mining Journal</i>, New York City, 15c.</p> <p>(17) <i>Street Railway Journal</i>, New York City, 35c.</p> <p>(18) <i>Railway and Engineering Review</i>, Chicago, Ill., 10c.</p> <p>(19) <i>Scientific American Supplement</i>, New York City, 10c.</p> <p>(20) <i>Iron Age</i>, New York City, 10c.</p> <p>(21) <i>Railway Engineer</i>, London, England, 25c.</p> <p>(22) <i>Iron and Coal Trades Review</i>, London, England, 25c.</p> <p>(23) <i>Bulletin, American Iron and Steel Assoc.</i>, Philadelphia, Pa.</p> <p>(24) <i>American Gas Light Journal</i>, New York City, 10c.</p> <p>(25) <i>American Engineer</i>, New York City, 20c.</p> <p>(26) <i>Electrical Review</i>, London, England.</p> <p>(27) <i>Electrical World and Engineer</i>, New York City, 10c.</p> <p>(28) <i>Journal, New England Water-Works Assoc.</i>, Boston, \$1.</p> <p>(29) <i>Journal, Society of Arts</i>, London, England, 15c.</p> <p>(30) <i>Annales des Travaux Publics de Belgique</i>, Brussels, Belgium.</p> <p>(31) <i>Annales de l'Assoc. des Ing. Sortis des Ecôles Spéciales de Gand</i>, Brussels, Belgium.</p> | <p>(32) <i>Mémoires et Compte Rendu des Travaux</i>, Soc. Ing. Civ. de France, Paris, France.</p> <p>(33) <i>Le Génie Civil</i>, Paris, France.</p> <p>(34) <i>Portefeuille Economique des Machines</i>, Paris, France.</p> <p>(35) <i>Nouvelles Annales de la Construction</i>, Paris, France.</p> <p>(36) <i>La Revue Technique</i>, Paris, France.</p> <p>(37) <i>Revue de Mécanique</i>, Paris, France.</p> <p>(38) <i>Revue Générale des Chemins de Fer et des Tramways</i>, Paris, France.</p> <p>(39) <i>Railway Master Mechanic</i>, Chicago, Ill., 10c.</p> <p>(40) <i>Railway Age</i>, Chicago, Ill., 10c.</p> <p>(41) <i>Modern Machinery</i>, Chicago, Ill., 10c.</p> <p>(42) <i>Transactions, Am. Inst. Elec. Engrs.</i>, New York City, 50c.</p> <p>(43) <i>Annales des Ponts et Chaussées</i>, Paris, France.</p> <p>(44) <i>Journal, Military Service Institution</i>, Governor's Island, New York Harbor, 50c.</p> <p>(45) <i>Mines and Minerals</i>, Scranton, Pa., 20c.</p> <p>(46) <i>Scientific American</i>, New York City, 8c.</p> <p>(47) <i>Mechanical Engineer</i>, Manchester, England.</p> <p>(54) <i>Transactions, Am. Soc. C. E.</i>, New York City, \$5.</p> <p>(55) <i>Transactions, Am. Soc. M. E.</i>, New York City, \$10.</p> <p>(56) <i>Transactions, Am. Inst. Min. Engrs.</i>, New York City, \$5.</p> <p>(57) <i>Colliery Guardian</i>, London, England.</p> <p>(58) <i>Proceedings, Eng. Soc. W. Pa.</i>, 410 Penn Ave., Pittsburg, Pa., 50c.</p> <p>(59) <i>Transactions, Mining Inst. of Scotland</i>, London and Newcastle-upon-Tyne.</p> <p>(60) <i>Municipal Engineering</i>, Indianapolis, Ind., 25c.</p> <p>(61) <i>Proceedings, Western Railway Club</i>, 225 Dearborn St., Chicago, Ill., 25c.</p> <p>(62) <i>American Manufacturer and Iron World</i>, 59 Ninth St., Pittsburg, Pa.</p> <p>(63) <i>Minutes of Proceedings, Inst. C. E.</i>, London, England.</p> <p>(64) <i>Power</i>, New York City, 20c.</p> <p>(65) <i>Official Proceedings</i>, New York Railroad Club, Brooklyn, N. Y., 15c.</p> <p>(66) <i>Journal of Gas Lighting</i>, London, England, 15c.</p> <p>(67) <i>Cement and Engineering News</i>, Chicago, Ill., 25c.</p> <p>(68) <i>Mining Journal</i>, London, England.</p> |
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## LIST OF ARTICLES.

**Bridge.**

- The Footbridge for Building the Cables of the New East River Bridge.\* Isaac Harby, Jun. Am. Soc. C. E. (54) Vol. xlix.  
 The Widening of London Bridge.\* (12) Serial beginning Dec. 5.  
 Construction of the Blackwell's Island Bridge Masonry.\* (14) Dec. 13.  
 The Design and Construction of a 50-ft. Brick Arch Culvert across Rock Creek, Washington, D. C.\* W. J. Douglas. (13) Dec. 25.  
 Bridges, Foundations, Docks and Water Fronts, and Canals. William H. Burr, M. Am. Soc. C. E., M. Inst. C. E. (14) Jan. 3.  
 The Monongahela Bridge.\* (14) Jan. 3.  
 The Mississippi River Bridge at Thebes.\* (15) Jan. 9.  
 Le Pont Monumental de Luxembourg.\* Cart. (38) Dec.  
 Nouvelle Méthode pour le Calcul du Moment de Résistance  $i/v$  et du Moment d'Inertie I.\* Lathuillière. (36) Dec. 10.

**Electrical.**

- Investigations of Magnetic Fields, with reference to Ore-Concentration.\* Walter R. Crane. (56) Vol. xxxi.  
 Three-Wire System for Variable Speed Motor Work.\* N. W. Storer. (42) Dec.  
 The Storage Battery as a Factor in Speed Control.\* H. Blohs. (42) Dec.  
 Electrically Operated Coal Hoist Having Variable Speed Control.\* P. O. Keilholtz. (42) Dec.  
 A Series-Parallel System of Speed Control.\* Geo. W. Fowler. (42) Dec.  
 Multiple Unit, Voltage Speed Control for Trunk Line Service.\* H. Ward Leonard. (42) Dec.  
 Continuous Current Motors for Machine Tools. F. O. Blackwell. (42) Dec.  
 The Use of Specification Forms in Designing Dynamo Machinery, and the Design of a Rotary Converter. H. M. Hobart. (26) Serial beginning Dec. 5.  
 Commutation.\* H. St. Hill Mawdsley. (26) Dec. 5.  
 Experiments on the Application of Pupin's System to Telephone Circuits. F. Dolezalek and A. Ebeling. (26) Serial beginning Dec. 12.  
 Cleckheaton Electricity Works.\* (26) Dec. 12.  
 Imperial Telegraphic Communication. Charles Bright. (26) Serial beginning Dec. 12.  
 Some Limits in Heavy Electrical Engineering. James Swinburne. (Presidential address delivered before the Inst. of Elec. Engrs.) (47) Serial beginning Dec. 13; (26) Serial beginning Dec. 12.  
 Electrochemical Oscillations.\* Woolsey McA. Johnson. (27) Dec. 13.  
 Three-Phase Measurements.\* A. S. McAllister. (27) Dec. 13.  
 The Manufacture and Laying of the Vera Cruz-Frontera-Campeche Cable for the Mexican Government.\* (27) Dec. 13.  
 Photometry for Electricians and Others. (66) Dec. 16.  
 On Electrons. Sir Oliver Lodge. (Paper read before the Inst. Elec. Engrs.) (26) Serial beginning Dec. 19.  
 A Criticism of Present-Day Continuous-Current Designing. Fred. W. Davies. (26) Dec. 19.  
 Electric Heating and Lighting in the Carnegie Residence, New York.\* (14) Dec. 20.  
 Ruhmer's Photoelectric Telephone.\* A. Frederick Collins. (27) Dec. 20.  
 A French System of Train Lighting. P. Letheule. (27) Dec. 20.  
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 The New Niagara.\* Waldon Fawcett. (62) Dec. 25.  
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 The Designing of Polyphase Current Machines. David Bergman. (26) Dec. 26.  
 300-Kilowatt Triple-Expansion Engine; Middlesbrough Electricity Works.\* (11) Dec. 26.  
 Electrically-Driven Quadruplex Two-Stage Compressors, and Their Use for Power in Collieries and Works.\* (22) Dec. 26.  
 The Cauvery Falls Power Plant.\* (16) Dec. 27.  
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 Electric Power in India; the Cauvery Falls Plant.\* J. H. Thomson. (10) Jan.  
 Economy in the Design and Operation of Electric Plants.\* Percival Robert Moses. (9) Jan.  
 Modern Tendencies in the Development and Transmission of Power. John Joseph Flather, M. Am. Soc. M. E. (Abstract of Vice-Presidential address before the Am. Assoc. for the Advancement of Science.) (13) Jan. 1.  
 The Water and Electric Power System of the Pike's Peak Power Co., Col.\* W. P. Hardesty. (13) Jan. 1.  
 Electrical Distribution of Power in Industrial Establishments. Cecil P. Poole, Member A. I. E. E. (14) Jan. 3.  
 The First Three-Phase Power Transmission Plant in Europe Operating at 30,000 Volts.\* H. Behn-Eschenburg. (27) Jan. 3.  
 Analysis of Wireless Telegraph Systems in 1902.\* A. Frederick Collins. (27) Jan. 3.  
 The Relation of Synchronous Impedance to the Impedance at Standstill. F. Townsend, H. P. Freund, W. I. Reich. (27) Jan. 3.  
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 New Shops of the British Thomson-Houston Company.\* (27) Jan. 3.  
 Three-Phase Measurements. Leslie L. Perry. (27) Jan. 10.  
 Electrical Supply from Water Power at Portland, Me.\* Alton D. Adams. (27) Jan. 10.

\* Illustrated.



**Electrical—(Continued).**

- Mesure à l'Aide d'un Seul Wattmètre de la Puissance dans les Circuits Équilibrés. Par courus par des Courants Triphasés.\* Octave Robert. (36) Dec. 10.  
 Station Centrale Électrique de Waterside à New York.\* F. Drouin. (33) Dec. 13.  
 Fabrication des Lampes Électriques à Incandescence.\* Paul Razoux. (33) Dec. 20

**Marine.**

- The Submarine Torpedo Boat. *Protector*.\* (12) Dec. 12.  
 The Application of Turbine Propulsion to Passenger Vessels.\* Herbert C. Fyfe. (46) Dec. 13.  
 The New German Battleship *H.*\* (12) Dec. 19.  
 The New Armored Cruisers *Tennessee* and *Washington*.\* (46) Dec. 27.  
 Developing a British War Post, an Outlay of £4 500 000 (Dockyard Extension).\* Archibald S. Hurd. (10) Jan.  
 A New Departure in British Cruiser Machinery; the Question of Water-Tube Boilers.\* George Halliday. (10) Jan.  
 The New York Shipbuilding Company's Plant, Camden, N. J.\* (14) Serial beginning Jan. 3.

**Mechanical.**

- Problems in Hauling and Hoisting. Alexander Bowie. (56) Vol. xxxi.  
 The D'Auria Air-Compressor.\* Henry G. Morris. (56) Vol. xxxi.  
 Machine Tools. Jas. K. Cullen. (61) Nov. 18.  
 Some Notes on Several Types of Mantles for Incandescent Gas Burners. William Lincoln Smith. (7) Dec.  
 The Operation of Machine Shops by Individual Electric Motors. R. T. E. Lozier. (42) Dec.  
 Modern Handling of Iron Ore on the Great Lakes.\* Jas. N. Hatch. (4) Dec.  
 Foundry Management in the New Century.\* Robert Buchanan. (9) Serial beginning Dec.  
 Flow Through Centrifugal Pumps.\* Jas. Alex. Smith. (Paper read before the Victorian Inst. of Engrs.) (11) Dec. 5.  
 The Brunck System of By-Product Coke Ovens.\* (22) Dec. 5.  
 The Lighting of Factories. J. H. Brearley. (Paper read before the Manchester District Inst. of Gas Engrs.) (66) Dec. 9.  
 Briquetting Iron Flue Dust. R. M. Hale. (20) Dec. 11.  
 High Pressure Steam Piping. William Andrews. (Paper read before the Engine Builders' Assoc. of the U. S.) (20) Dec. 11; (13) Dec. 18; (14) Dec. 20.  
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Lake Bohio, the Summit Level of the Panama Canal.\* George S. Morison. (9) Jan.  
Bridges, Foundations, Docks and Water Fronts, and Canals. William H. Burr, M. Am. Soc. C. E., M. Inst. C. E. (14) Jan. 3.  
Notice sur le Port de Trieste et sur les Travaux d'Aggrandissement Projetés et en Cours d'Exécution. G. B. Antonelli. (30) Dec.





## AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1852.

## PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

## SOCIETY AFFAIRS.

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## MINUTES OF MEETINGS.

## OF THE SOCIETY.

## FIFTIETH ANNUAL MEETING.\*

**January 21st, 1903.**—The meeting was called to order at 10.45 A. M., Vice-President Charles C. Schneider in the chair; Charles Warren Hunt, Secretary.

The reading of the minutes of the meeting of January 7th, 1903, was dispensed with.

Messrs. G. S. Stoddart and C. D. Pollock were appointed tellers to canvass the Ballot for Officers for the ensuing year.

The Annual Report of the Board of Direction† and the Annual Reports of the Secretary‡ and of the Treasurer‡ for the year ending

\* A full report of the Fiftieth Annual Meeting is printed on pages 42 to 80 of this number of *Proceedings*.

† The Annual Reports of the Board of Direction, the Secretary and the Treasurer may be found on pages 5 to 14 of the *Proceedings* for January, 1903 (vol. xxix).

December 31st, 1902, were presented, and, on motion, duly seconded, accepted.

The Progress Report of the Special Committee on Uniform Tests of Cement\* was presented by George S. Webster, M. Am. Soc. C. E., Chairman of that Committee.

At 11.20 A. M. the chair was taken by President Robert Moore.

On motion, duly seconded, the report was received and ordered printed in *Proceedings*, and the Committee continued.

On motion, duly seconded, the Committee was thanked for its labor and report.

A progress report from the Special Committee on Rail Sections was presented by L. F. G. Bouscaren, M. Am. Soc. C. E., Chairman of that Committee.

On motion, duly seconded, the Committee was continued.

The following were appointed members of the Nominating Committee for two years:

GEORGE W. TILLSON.....	Representing District No. 1.
J. P. SNOW.....	" " " 2.
EDWARD A. BOND.....	" " " 3.
RICHARD KHUEN, Jr.....	" " " 4.
L. E. CHAPIN.....	" " " 5.
JOHN B. ATKINSON.....	" " " 6.
D. C. HENNY.....	" " " 7.

The Secretary reported that the Board of Direction had awarded the prizes for the year ending with the month of July, 1902, as follows:

The Norman Medal to Paper No. 911, entitled, "Experiments at Detroit, Mich., on the Effect of Curvature upon the Flow of Water in Pipes," by Gardner S. Williams, M. Am. Soc. C. E.; Clarence W. Hubbell, Assoc. M. Am. Soc. C. E., and George H. Fenkell, Jun. Am. Soc. C. E.

The Thomas Fitch Rowland Prize to Paper No. 910, entitled, "Description of Coos Bay, Oregon, and the Improvement of Its Entrance by the Government," by William W. Harts, M. Am. Soc. C. E.

The consideration of the following proposed amendment to the Constitution was then taken up:

Amend Article III of the Constitution as follows:

Section 2, first line, after the words "Society as" strike out the words "Member or as Associate" and insert the words "a Corporate"; second line, after the word "to" strike out the words "either grade of."

Section 2, Art. III, will then read, "An application for admission to the Society as a Corporate Member, or for transfer from any other

\* This report is printed in *Proceedings* for January, 1903.

grade to Corporate Membership shall embody," the rest of the section standing as now.

Section 3, third line, after the word "membership" strike out the words "in any grade," and after the word "transfer" strike out the words "from one grade to another"; twelfth line, for the word "may" substitute the word "shall." The section will then read as follows:

"At stated periods, to be determined by the Board of Direction, there shall be issued to each member in any grade whose address is known, a list of all new applications received for membership or for transfer, which list shall be dated and shall contain a concise statement of the record of each applicant and the names of the references in the case of Corporate Member, and endorsers in the case of Associate, Junior or Fellow, with a request that members transmit to the Board any information in their possession which may affect the disposition of the applications. Not less than twenty days after the issue of such list, the Board of Direction shall consider these applications together with any information in regard to the applicants that may have been received; may make further inquiries, if deemed expedient; shall classify the applicant with his consent, and on applications for Corporate Membership may direct a ballot."

This amendment was proposed by Messrs. H. G. Prout, G. S. Williams, Alf. P. Boller, Geo. Y. Wisner and Geo. F. Swain, and was sent to all Corporate Members on October 2d, 1902.

The amendment was discussed, but was not amended.

A resolution,\* relative to the death of Abram S. Hewitt, was offered by George S. Morison, Past-President, Am. Soc. C. E., seconded by Robert W. Hunt, M. Am. Soc. C. E., and carried unanimously.

J. A. Ockerson, M. Am. Soc. C. E., offered the following resolution:

*Resolved*, That it is the sense of this meeting that the American Society of Civil Engineers should co-operate with the officers of the Louisiana Purchase Exposition Company, in the inauguration of an International Congress of Engineering, to be held in St. Louis, during the Exposition period of 1904, and be it further

*Resolved*, That the Board of Direction be, and is, hereby, authorized and requested to take such steps as may be necessary to carry out the provisions of the foregoing resolution.

The resolution, being duly seconded, was carried.

The Secretary presented the report of the tellers appointed to canvass the Ballot for Officers for the ensuing year.

The President announced the election of the following officers:

*President, to serve one year:*

ALFRED NOBLE, New York City.

*Vice-Presidents, to serve two years:*

L. F. G. BOUSCAREN, Cincinnati, Ohio.

JAMES D. SCHUYLER, Los Angeles, Cal.

\* See page 70.

† See page 72.

*Treasurer, to serve one year*

JOSEPH M. KNAP, New York City.

*Directors, to serve three years:*

*District No. 1.*—ALFRED CRAVEN, Yonkers, N. Y.

*District No. 1.*—JOSEPH O. OSGOOD, Plainfield, N. J.

*District No. 4.*—GEORGE S. DAVISON, Pittsburg, Pa.

*District No. 6.*—E. C. LEWIS, Nashville, Tenn.

*District No. 6.*—HUNTER McDONALD, Nashville, Tenn.

*District No. 7.*—ELWOOD MEAD, Cheyenne, Wyo.

Mr. Morison and Mr. Croes conducted Mr. Noble, the President-elect, to the chair.

The Secretary read a letter from Robert Moore, Past-President, Am. Soc. C. E., to the effect that, in pursuance of the resolution passed at the last Annual Convention an oak tree had been planted at Mt. Vernon as a memorial of the visit of the Society in May, 1902; and that this work had been executed by Messrs. Gifford Pinchot and George B. Sudworth, of the Bureau of Forestry, and Harrison H. Dodge, Superintendent of the Mt. Vernon Estate.

It was moved, duly seconded and carried that the Secretary be instructed by this meeting to extend the thanks of the Society to the gentlemen named for executing this commission.

Adjourned.

**February 4th, 1903.**—The meeting was called to order at 8.50 p. m., President Noble in the chair; Chas. Warren Hunt, Secretary; and present, also, 100 members and 20 guests.

The minutes of the meeting of January 7th, 1903, were approved as printed in *Proceedings* for January, 1903. The approval of the minutes of the Annual Meeting was deferred until they are printed in the *Proceedings* for February, 1903.

An informal discussion on "The Preservation of Materials of Construction," was opened by William Barclay Parsons, M. Am. Soc. C. E., who exhibited perfectly preserved specimens of wood taken from the excavation for the Metropolitan Underground Railway of Paris at the site of the ancient "Porte du Temple," founded during the reign of Charles V, 1364-1380. He also showed a section of wooden water pipe, taken from the excavation for the New York Rapid Transit Subway on Center Street, which had been in the ground about 100 years, and yet was perfectly preserved. The Secretary presented a letter from Mr. James Forgie, Chief Assistant Engineer of the City and South London Deep Underground Railways, transmitting and describing a piece of iron about 200 years old, in the form of a masonry

cramp or bonding iron, on which no trace of rusting could be seen. The iron had been found, in 1899, embedded in the sandstone masonry of a pier in the crypt of St. Mary Woolnoth Church, in London, where the foundations of a railroad depot were being made. The letter was accompanied by a photograph of the crypt, showing the place where the iron was found. Rudolph P. Miller, Assoc. M. Am. Soc. C. E., described the condition of the metal in a large building of modern construction, in New York City, which is now being taken down, and illustrated his remarks with lantern slides.

The subject was discussed further by Messrs. George Hill, W. W. Kenley, George A. Just, Edward P. North, Oscar Lowinson and Henry B. Seaman.

Ballots for membership were canvassed, and the following candidates were elected:

#### AS MEMBERS.

HARRY SHERMAN BOSLER, Akron, Ala.

GEORGE ELVIN DATESMAN, Philadelphia, Pa.

ARTHUR JAMES DYER, Nashville, Tenn.

WILLIAM HENRY FINLEY, Winnetka, Ill.

GRAHAM DENBY FITCH, Little Rock, Ark.

ISHAM RANDOLPH, Chicago, Ill.

CHARLES WINSLOW SHERMAN, Boston, Mass.

HENRY CLARK THOMPSON, New York City.

GEORGE MONROE WISNER, Chicago, Ill.

#### AS ASSOCIATE MEMBERS.

JAMES MARCUS BANDY, Greensboro, N. C.

EDWARD CHRISTIAN HENRY BANTEI, Austin, Tex.

SAM WIGFALL BRADSHAW, Steelton, Pa.

PER BRYNN, Pittsburg, Pa.

HARRIS DE HAVEN CONNICK, San Francisco, Cal.

RICHARD TURNER DANA, Ridgewood, N. J.

EDWARD BLISS DAY, St. Louis, Mo.

HORACE DE REMER HAIGHT, Albany, N. Y.

JOSEPH MILTON HOWE, Houston, Tex.

HENRY SCUDDER JAUDON, Birmingham, Ala.

GEORGE ALBERT MCKAY, Newport, R. I.

HIBBARD ATWILL PAINE, Chandler, Okla. T.

WILLIAM EDWIN PINCOMBE, Calcutta, India.

JAMES VINCENT ROCKWELL, Eagle Grove, Iowa.

EDWARD MOSES STAYTON, Hope, Ark.

LAZARUS WHITE, New York City.



The Secretary announced the election of the following candidates by the Board of Direction on February 3d, 1903:

AS ASSOCIATES.

RUDOLF CASPAR CARL MARIE BERNEGAU, New York City.  
OTTO BALTHAZAR KELLER, New York City.  
EUGENE McGRATH QUIRK, Montreal, Que., Canada.

AS JUNIORS.

JOHN SEAGER ADEY, New York City.  
ROBERT JAY BASSETT, Steelton, Pa.  
JOHN ANTHONY CROOK, Falls City, Neb.  
SHUKICHI FUJINO, Pencoyd, Pa.  
HUGH MELVIN GEORGE, Meridian, Miss.  
FREDERICK APPEL HAUSMAN, Bridgeport, Pa.  
VERNET ALBERT KAUFFMAN, Alamogordo, N. Mex.  
HENRY JACOB KOLB, Steelton, Pa.  
GEORGE EDSON PHILIP SMITH, Tucson, Ariz.  
TRAVIS LOGAN SMITH, Jr., Fulshear, Tex.  
CHARLES UNDERHILL STEPETH, New York City.  
CARL TOMBO, New York City.  
EDWARD LLOYD WALKER, Paterson, N. J.  
EZRA BAILEY WHITMAN, New York City.  
WALDO GILMAN WILDES, Clinton, Mass.  
BENJAMIN LEE WILLIAMS, Jr., West Orange, N. J.  
CAROLUS HERMANN ZANE-CETTI, Fort Worth, Tex.

The Secretary announced the death of the following members:

WATSON WELLMAN RICH, elected Member September 5th, 1883; died January 12th, 1903.

ESTEVEAN ANTONIO FUERTES, elected Member February 17th, 1869; died January 16th, 1903.

ELNATHAN SWEET, elected Member November 6th, 1878; died January 27th, 1903.

Adjourned.

**February 18th, 1903.**—The meeting was called to order at 8.50 P. M., President Noble in the chair; Chas. Warren Hunt, Secretary; and present, also, 121 members and 35 guests.

A paper entitled, "The Panama Canal," by George S. Morison, Past-President, Am. Soc. C. E., was presented by the author, and illustrated with lantern slides.

A written communication on the subject, by M. Meigs, M. Am. Soc. C. E., was presented by the Secretary.

The subject was discussed orally by Messrs. Theodore Paschke, W.

H. Burr, C. L. Harrison, Boyd Ehle, W. E. Crane, P. Bunau-Varilla and the author.

The Secretary announced the death of JOHN WALKER BARRIGER, Jr., elected Junior May 31st, 1898; Associate Member, April 2d, 1902; died December 19th, 1902.

Adjourned.

## OF THE BOARD OF DIRECTION.

(Abstract.)

**January 21st, 1903.**—2.30 P. M.—President Noble in the Chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Buck, Craven, Davison, Jackson, Knap, Moore, Osgood, Pegram, Schneider, Swain and Wilgus.

A Committee on Finance, a Library Committee, a Committee on Publications, and a Committee on Membership, were appointed.

A letter-ballot was ordered for the election of a Secretary for the ensuing year.

Adjourned.

**February 3d, 1903.**—8.40 P. M.—President Noble in the Chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Craven, Croes, Endicott, Knap, Kuichling, Osgood, Swain and Wilgus.

The ballot for Secretary was canvassed, by tellers appointed for the purpose, and Chas. Warren Hunt was declared elected.

The resolution, passed at the Annual Meeting, recommending co-operation with the officers of the Louisiana Purchase Exposition Company, in the matter of a proposed International Congress of Engineering, to be held in St. Louis during the Exposition of 1904, was referred to a Special Committee of the Board.

The resignations of Horace See, M. Am. Soc. C. E., and C. W. Walton, M. Am. Soc. C. E., were accepted.

A Committee of the Board was appointed to take up the matter of a proposed revision of the rules for the award of the Collingwood Prize for Juniors.

Applications were considered, and other routine business transacted.

Three candidates for Associate and seventeen for Junior were elected.\*

Adjourned.

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\* See page 40.

## REPORT IN FULL OF THE FIFTIETH ANNUAL MEETING, JANUARY 21st and 22d, 1903.

Meeting called  
to order.

**Wednesday, January 21st, 1903.**—The meeting was called to order at 10:45 A. M.; Vice-President C. C. Schneider in the chair; Charles Warren Hunt, Secretary.

THE CHAIRMAN.—The minutes of the meeting of January 7th, 1903, will be printed in the January number of *Proceedings*, and come up in due course for action at the meeting of February 4th. In view of this fact, the reading of those minutes will be dispensed with, if there are no objections.

Tellers  
appointed.

The time has arrived now for canvassing the votes for officers, and I will appoint Messrs. G. S. Stoddard and C. D. Pollock as tellers. The ballot will be closed, in accordance with the Constitution, at twelve o'clock noon. Any member present who has not voted may vote, up to that time. In order to finish the count of the ballot in time, the tellers may proceed at once with the count.

The next business is the reading of the report of the Board of Direction for 1902.

Report of the  
Board of  
Direction.

The Secretary read the report of the Board of Direction.\*

THE CHAIRMAN.—You have heard the report of the Board of Direction. What action will you take?

A MEMBER.—I move that the report be received and placed on file. Seconded and carried.

THE CHAIRMAN.—The report of the Secretary to the Board of Direction.

The Secretary read his report.†

THE CHAIRMAN.—You have heard the Secretary's report. What action will you take in reference to it?

It was moved and seconded that the report be received and placed on file.

Carried.

THE CHAIRMAN.—The report of the Treasurer.

The Treasurer read his report.‡

THE CHAIRMAN.—Gentlemen, what action will you take with reference to the Treasurer's report? If there are no objections, it will be received and placed on file.

Reports of  
Special  
Committees.

The report of the Special Committee on Uniform Tests of Cement, Mr. Geo. S. Webster, Chairman.

Report read by Mr. Webster.§

(At 11.20 A. M. the chair was taken by the President, Mr. Robert Moore.)

THE PRESIDENT.—You have heard the report, and it is now open for discussion or for such action as the meeting sees fit to take.

\* See *Proceedings*, Vol. xxix, p. 5 (January, 1903).

† See *Proceedings*, Vol. xxix, p. 12 (January, 1903).

‡ See *Proceedings*, Vol. xxix, p. 14 (January, 1903).

§ See *Proceedings* for January, 1903.

J. JAMES R. CROES, Past-President, Am. Soc. C. E.—I move that the report be received and printed in the *Proceedings*, and the Committee continued.

Seconded and carried.

E. B. CODWISE, M. Am. Soc. C. E.—I move that the Committee be thanked for their labor and their report.

Seconded and carried.

THE PRESIDENT.—The next thing in order is the report from the Committee on Rail Sections; Mr. Bouscaren, Chairman. I believe he has a progress report.

The report was read by Mr. Bouscaren as follows:

“The Special Committee on Rail Sections would report that it has made progress in its labors; has been and is in correspondence with the Chief Engineers of many of the railroads of the United States and Canada; and that the reports received from them show greater proportionate wear of the heavier than of the lighter sectioned rails.

“They would also report that the steel rail manufacturers of the United States have appointed a committee to act in consultation with your committee, and that one joint session has been held. Your committee asks to be continued.”

“G. BOUSCAREN,  
Chairman.”

THE PRESIDENT.—You have heard the report, gentlemen, and also the request of the Committee that they be continued. What action will you take?

MR. CODWISE.—I move that the request be granted.

Seconded and carried.

THE PRESIDENT.—The next order of business is action upon the nominations for the seven geographical districts for members of the next Nominating Committee. We will hear the reports of the nominations which have been made by the members of those districts.

Nominating  
Committee.

THE SECRETARY.—The report from District No. 1 is as follows:

*District No. 1.*—Total number of votes received, 98; distributed as follows:

GEORGE W. TILSON.....	24
FREDERICK S. ODELL.....	19
HENRY W. HODGE.....	16
C. H. GRAHAM.....	3
GEORGE S. RICE.....	3
J. V. DAVIES.....	2
J. J. R. CROES*.....	2
GEORGE B. FRANCIS....	2
CHARLES S. GOWEN.....	2
ALLEN HAZEN.....	2
O. F. NICHOLS.....	2
T. KENNARD THOMSON.....	2
S. C. THOMPSON.....	2

\* Ineligible.

Nominating  
Committee  
(Continued).

The following have received one vote each:

WM. HENRY BALDWIN,	EDWARD P. NORTH,
WILLIAM H. BURR,	JOHN F. O'ROURKE,
S. L. F. DEYO,	E. E. OLCOTT,
WILLIAM B. FULLER,	J. WALDO SMITH,
MARTIN GAY,	M. G. STARRETT,
S. W. HOAG, Jr.,	EDWARD WEGMANN,
GEORGE A. JUST,	S. C. WEISKOPF,
HENRY P. MORRISON,	W. J. WILGUS,*
F. STUART WILLIAMSON.	

THE SECRETARY.—The members of the Nominating Committee are to be elected by this meeting, and this is merely a suggestion to the meeting.

THE PRESIDENT.—The Chair awaits suggestions in that matter, as to the pleasure of the Society.

J. M. KNAP, Treasurer, Am. Soc. C. E.—I move that the usual course be adopted, and that we elect the man who receives the largest number of votes, who, I think, in this case, is Mr. Tillson.

Seconded.

THE PRESIDENT.—It is moved and seconded that Mr. Tillson be the choice of the meeting for this district.

Carried.

THE SECRETARY.—From District No. 2 the report is as follows:

*District No. 2.*—Total number of votes received, 42; distributed as follows:

J. P. SNOW.....	11
CLARENCE B. VORCE.....	8
GEORGE A. KIMBALL*.....	4
FREDERIC P. STEARNS .....	4
C. FRANK ALLEN.....	2
S. E. TINKHAM.....	2

The following have received one vote each:

A. S. CHEEVER,	GEORGE R. HARDY,
FREEMAN C. COFFIN,	C. M. INGERSOLL,
DESMOND FITZGERALD,*	LEONARD METCALF,
GEORGE B. FRANCIS,*	MACE MOULTON,
ARTHUR W. FRENCH,	EDWARD SAWYER,
GEORGE F. SWAIN.*	

C. S. ALLEN, M. Am. Soc. C. E.—I move that Mr. J. P. Snow be elected on the Nominating Committee.

Seconded and carried.

THE SECRETARY.—The District No. 3 report is as follows:

*District No. 3.*—Total number of votes received, 66; distributed as follows:

EDWARD A. BOND.....	29
PALMER C. RICKETS.....	19
CHARLES M. MORSE.....	2
P. ALEXANDER PETERSON ..	2
GARDNER S. WILLIAMS.....	2

\* Ineligible.



The following have received one vote each:

JOHN F. ALDEN,*	JOHN KENNEDY.
FRANK V. E. BARDOL.	LOUIS H. KNAPP.
E. E. BRYDENE-JACK.	OLIN H. LANDRETH.
ROBERT CARTWRIGHT.	E. H. McHENRY.
CLARK FISHER.	ELNATHAN SWEET.
WILLIAM A. HAVEN.	T. W. SYMONS.

THE PRESIDENT.—Is there any motion?

MR. E. B. CODWISE.—I move that Mr. Edward A. Bond, having received the highest number of votes on the ballots, be declared elected.

Seconded and carried.

THE SECRETARY.—The ballot from District No. 4 is as follows:

*District No. 4.*—Total number of votes received, 107; distributed as follows:

RICHARD KHUEN, Jr. . . . .	47
L. Y. SCHERMERHORN . . . . .	22
H. M. WILSON . . . . .	17
BERNARD R. GREEN . . . . .	2
EMIL SWENSSON . . . . .	2

The following have received one vote each:

EDWARD M. BIGELOW,	N. H. HUTTON,
WILLIAM BRADFORD,	HARVEY LINTON,
W. W. CARD,	F. O. MAXSON,
ARTHUR P. DAVIS,	MANSFIELD MERRIMAN,
GEORGE S. DAVISON,*	WILLIAM A. PRATT,
J. E. GREINER,	E. B. TAYLOR,
G. B. HAZLEHURST,	S. LA R. TONE,
JOHN W. HILL,	SAMUEL TOBIAS WAGNER,*
GEORGE S. WEBSTER.	

THE PRESIDENT.—Richard Khuen has the largest number of votes. It is moved and seconded that his election be made unanimous.

Carried.

THE SECRETARY.—District No. 5 votes:

*District No. 5.*—Total number of votes received, 79; distributed as follows:

L. E. CHAPIN . . . . .	25
J. B. DAVIS . . . . .	8
WILLIAM M. HUGHES . . . . .	6
R. B. C. BEMENT . . . . .	3
G. A. MARR . . . . .	3
JOHN W. ALVORD . . . . .	2
CHARLES E. GREENE . . . . .	2
D. W. MEAD . . . . .	2
C. J. A. MORRIS . . . . .	2
SAMUEL T. WELLMAN . . . . .	2

\* Ineligible.

Nominating  
Committee  
(Continued).

The following have received one vote each:

WARD BALDWIN,	CHARLES F. LOWETH,
L. F. G. BOUSCAREN,*	RALPH MODJESKI,
GEORGE H. BOYNTON,	G. B. NICHOLSON,*
W. M. CAMP,	WALTER P. RICE,
D. D. CAROTHERS,	H. E. RIGGS,
E. C. CARTER,*	JAMES RITCHIE,
CLARENCE COLEMAN,	J. W. SCHAUB,
F. A. DELANO,	E. C. SHANKLAND,
JAMES DUN,	CHARLES L. STROBEL,
R. L. ENGLE,	JOB TUTHILL,
E. E. HASKEEL,	L. L. WHEELER,
G. W. KITTREDGE,	GEORGE Y. WISNER.

On motion, duly seconded, Mr. L. E. Chapin was elected as member of the Nominating Committee.

THE SECRETARY.—District No. 6:

*District No. 6.*—Total number of votes received, 46; distributed as follows:

JOHN B. ATKINSON.....	5
ARTHUR HIDER.....	3
J. A. L. WADDELL.....	3
GEORGE G. EARL.....	2
L. F. GOODALE.....	2
B. M. HARROD.....	2
C. D. PURDON.....	2
S. BENT RUSSELL.....	2

The following have received one vote each:

JAMES P. ALLEN,	D. W. LUM,
WILLIAM CAIN,	R. C. MCCALLA,
W. W. CARSON,	HUNTER McDONALD,*
WILLIAM H. COURTENAY,	F. A. MOLITOR,
WILLIAM P. CRAIGHILL,	R. MONTFORT,
BEN. L. CROSBY,	GEO. B. NICHOLSON,
EDWARD FLAD,	J. A. OCKERSON,
B. M. HALL,	M. P. PARET,
W. J. HARDEE,	HIRAM PHILLIPS,
W. N. HAZLEHURST,	A. M. SCOTT,
E. C. LEWIS,*	B. F. THOMAS,
J. L. LUDLOW,	C. C. WENTWORTH,

JOSÉ R. VILLALON.

THE PRESIDENT.—Mr. John B. Atkinson has the largest number of votes. Is there any motion? If not, those who are in favor of the election of John B. Atkinson will say aye.

Carried.

THE SECRETARY.—District No. 7:

---

\* Ineligible.

*District No. 7.*—Total number of votes received, 44; distributed as follows:

D. C. HENNY.....	9
C. E. GRUNSKY. . . . .	4
C. D. MARX . . . . .	4
ROBERTO GAYOL.....	2
HORACE A. SUMNER.....	2
A. J. TULLOCK . . . . .	2
OTTO VON GELDERN.....	2

The following have received one vote each:

W. A. AYCRIGG,	C. E. FOWLER,
JULIUS BAIER,	ARTHUR DEWITT FOOTE,
R. E. BRIGGS,	F. W. D. HOLBROOK,
R. B. BURNS,	JOHN D. ISAACS,
E. B. CUSHING,	W. H. KENNEDY,
GEORGE L. DILLMAN,	J. B. LIPPINCOTT,
H. W. EDWARDS,	J. W. MAXEY,
C. F. W. FELT,	D. W. ROSS,
W. W. FOLLETT,	W. B. STOREY, Jr.,
JAMES D. SCHUYLER.*	

THE PRESIDENT.—Mr. D. C. Henny has the largest number of votes. Those who are in favor of making him a member of the Nominating Committee signify by saying aye.

Carried.

THE PRESIDENT.—This concludes that order of business. The next is the report from the Board of Direction as to the award of the medal and prizes for the year ending with July, 1902. Award of Prizes.

THE SECRETARY.—I am directed by the Board of Direction to report that the Norman Medal and the Thomas Fitch Rowland Prize have been awarded by the Board, in accordance with the recommendations of the following report:

TO THE BOARD OF DIRECTION,

AMERICAN SOCIETY OF CIVIL ENGINEERS.

The undersigned respectfully recommend that awards of the Normal Medal and Thomas Fitch Rowland Prize for the year ending with the *Transactions* for July, 1902, be made as follows:

The Norman Medal to Paper No. 911, "Experiments at Detroit, Michigan, on the Effect of Curvature upon the Flow of Water in Pipes," by Gardner S. Williams, M. Am. Soc. C. E.; Clarence W. Hubbell, Assoc. M. Am. Soc. C. E., and George H. Fenkell, Jun. Am. Soc. C. E.

The Thomas Fitch Rowland Prize to Paper No. 910, "Description of Coos Bay, Oregon, and the Improvement of Its Entrance by the Government," by William W. Harts, M. Am. Soc. C. E.

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\* Ineligible.

Award of  
Prizes  
(Continued).

There being no papers contributed exclusively by Juniors, no recommendation as to the award of the Collingwood Prize for Juniors can be made.

Respectfully submitted,

H. M. CHITTENDEN,  
BERNARD R. GREEN,  
G. BOUSCAREN,

*Committee.*

THE PRESIDENT.—This is simply for information, and requires no action. The next order of business is the proposed amendment to the Constitution, which the Secretary will read.

Proposed  
Amendment  
to the  
Constitution.

THE SECRETARY.—This amendment to the Constitution has now gone through all the forms, and this meeting has the power to amend it and send it out as amended; if it is not amended at this meeting, it goes to the Society in the form in which it is at present.

Amend Article III of the Constitution as follows:

Section 2, first line, after the words "Society as" strike out the words "Member or as Associate" and insert the words "a Corporate"; second line, after the word "to" strike out the words "either grade of."

Section 2, Art. III, will then read, "An application for admission to the Society as a Corporate Member, or for transfer from any other grade to Corporate Membership shall embody," the rest of the section standing as now.

Section 3, third line, after the word "membership" strike out the words "in any grade," and after the word "transfer" strike out the words "from one grade to another"; twelfth line, for the word "may" substitute the word "shall." The section will then read as follows:

"At stated periods, to be determined by the Board of Direction, there shall be issued to each member in any grade whose address is known, a list of all new applications received for membership or for transfer, which list shall be dated and shall contain a concise statement of the record of each applicant and the names of the references in the case of Corporate Member, and endorsers in the case of Associate, Junior or Fellow, with a request that members transmit to the Board any information in their possession which may affect the disposition of the applications. Not less than twenty days after the issue of such list, the Board of Direction shall consider these applications, together with any information in regard to the applicants that may have been received; may make further inquiries, if deemed expedient; shall classify the applicant with his consent, and on applications for Corporate Membership may direct a ballot."

THE PRESIDENT.—The matter is open for discussion, gentlemen.

J. F. O'ROURKE, M. Am. Soc. C. E.—I would like to offer this amendment as a substitute for the amendment just read.

The Secretary read the amendment offered, as follows:

### Proposed Amendment to the Constitution.

Amend Article III of the Constitution as follows:

Strike out the first seven sections of Article III. and substitute the following:

1. Election to membership in all grades shall be by the Board of Direction, subject to the following procedure:

2. Honorary Members shall be proposed by at least ten members, and shall be elected only by a unanimous vote of the Board of Direction. A Past-President, or a member of the Board of Direction proposed for Honorary Membership, shall not be required to vote either for or against his own admission.

A person elected an Honorary Member shall be promptly notified thereof by letter. The election shall be canceled if an acceptance is not received within six months after the mailing of such notice.

3. Members, Associate Members, Associates, Juniors and Fellows, shall be elected by letter-ballot of the Board of Direction, and on such ballot three negative votes shall exclude.

4. An applicant for admission to the Society as Member or as Associate Member, or for transfer from any other grade to either grade of Corporate Membership, shall embody a concise statement, with dates, of the candidate's professional training and experience, and shall be in a form and in such detail as may be prescribed by the Board of Direction. It shall be signed by the applicant, and shall contain a promise to conform to the requirements of membership, if elected. The applicant shall furnish the names of at least five Corporate Members to whom he is personally known. Each of these shall be requested by the Secretary to address a letter to the Board of Direction, on a form prescribed by said Board, stating the extent of the writer's personal knowledge of the applicant and of his professional work. If at least five of the Corporate Members named as references do not furnish the requisite endorsement, the Secretary shall call upon the applicant for additional names, and not until written communications shall have been received from at least five Corporate Members shall the application be considered by the Board.

Applications of engineers not resident in North America, and who may be so situated as not to be personally known to five Corporate Members, may be endorsed by five Members of the Board of Direction, after having secured evidence sufficient, in their opinion, to show that the applicant is worthy of admission.

5. An application for admission as Associate, Junior, or Fellow, shall embody a statement of the applicant's qualifications for the grade of membership for which admission is sought. The application shall be signed by the applicant, and endorsed by at least three Corporate Members who shall certify that they personally know the applicant, and believe him to be in all respects a proper person to be admitted to the Society, and that they recommend him for admission.

6. At stated periods, to be determined by the Board of Direction, there shall be issued to each member in any grade whose address is known, a list of all applications received, which list shall be dated and shall contain a concise statement of the record of each applicant and the names of his references in the case of Corporate Member, and endorsers in the case of Associate, Junior or Fellow, with a request that members transmit to the Board any information in their possession which may affect the disposition of the applications. The names of applicants for admission as Member or Associate Member shall be



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alphabetically arranged as applicants for Corporate Membership, without specification as to which of these grades is sought. Not less than twenty days after the issue of such list, the Board of Direction shall consider these applications, together with any information in regard to the applicants that may have been received, and may then proceed to letter-ballot. The Society shall be notified of all elections.

Change the numbers of Sections 8, 9, 10 and 11 to 7, 8, 9 and 10, respectively.

B. R. GREEN, M. Am. Soc. C. E.—I second the amendment.

THE PRESIDENT.—This amendment has been offered and seconded, and is now open for discussion or action by the meeting.

A MEMBER.—Is it the intention of taking the vote on the amendment to the Constitution, or the amendment to the amendment, to-day?

THE PRESIDENT.—The amendment to this proposed amendment is pending.

A MEMBER.—As an amendment to the Constitution?

THE SECRETARY.—It requires a letter-ballot of the whole Society; action by this meeting is merely on the form in which the amendment shall be sent out.

P. C. RICKETTS, M. Am. Soc. C. E.—Mr. Chairman, it seems to me that the adoption of this amendment to the original amendment would be the defeat of the original amendment. This question of the election of members by the Board of Direction has been thoroughly considered in the past two or three years. There was a committee, as you recollect, appointed, and that committee reported, and it was defeated, as I remember, by the Society.

Now, it seems to me that the amendment proposed to-day is a good one, that is, that the classification shall be made by the Board of Direction; but the amendment to this amendment is not, in my opinion, a good one. I do not believe that the Board of Direction should have the entire charge of the affairs of the Society. I believe that, as far as the election of members of the Society is concerned, the Society is the best judge. It is true that every now and then a pink ballot comes out. They look very pink and they make an impression, but the committee appointed found—I forget the exact number, but I think it was something like thirty-two pink ballots in four or five years. It seems to me that the present method of electing members is a pretty good method and a pretty safe method. We all have a chance, those of us who are interested, to scan carefully the blue lists as they come out, and afterward the ballots, and can use our own judgment; and it is a pretty good, democratic way of doing things.

I think it would be a mistake to adopt this amendment to the amendment proposed.

H. G. PROUT, M. Am. Soc. C. E.—Mr. President, as the Chairman of the committee which originally produced the amendment which

has been circulated among you, it may be well for me to say two or three words. The intention of the work of our committee was simply to put the classification in the hands of the Board of Direction, as Professor Ricketts has pointed out. That is all we wished to do. We held that the Board of Direction had that power already, under the Constitution, but it did not seem quite clear that that was the case, and, therefore, the amendment which we proposed was designed to make that clear; that it was not only within the power of the Board of Direction to classify candidates, but that it was their duty. That is what our amendment was aimed to accomplish.

The amendment to that amendment which is brought forward now accomplishes that purpose, and it goes further, and puts the election in the hands of the Board of Direction. So far as that goes, I do not agree with Professor Ricketts. For many years I have held very stoutly the position that he has taken, namely, that the election should be in the great body of the Society, but within the last two or three years my feeling has changed, and I have come to believe that it would be better for the Society if the election of members were in the hands of the Directors. I should imagine that it would increase the sense of responsibility of every person who was directly interested in the election; that is to say, each member of the Board of Direction would feel that the responsibility was upon him of doing precisely the right thing. He could not soothe his conscience by knowing that there is another body to come after him, to confirm or reject his action, and surely the Board of Direction can know more precisely the fitness or unfitness of the candidate than can the great body of the members.

It is extremely difficult, I know, to get to a large body precise information very quickly, and especially negative information; but that need not be so. The Board of Direction can organize its machinery in such a way as to get more precise information, we will say, by appointing some committees among its own members to cover different territories, and take pains to get information about candidates; and my own feeling now is quite strong that the Society would get better results by having the election put in the hands of the Board of Direction.

FOSTER CROWELL, M. Am. Soc. C. E.—Mr. Chairman, I would also support the amendment to the amendment. The matter has been before the Society quite frequently, as one of the previous speakers has mentioned, and it seems to me that this presentation is an evidence of profound reflection upon the discussions that have gone before.

Having had the opportunity to support the general idea of the policy of the election of members by the Board, in the past, I have had my feelings confirmed that that is the most practical, exact and proper method of selecting the proper material. It is not my inten-

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tion to go into details at this time, but to point out that, with the present arrangement, when the pink ballot is sent out, there is always a strong effort, on the part of the friends of the candidate, to secure favorable action, upon the mere statement of their belief that the candidate is worthy. That has the effect of making the pink ballot entirely ineffectual, and there is no other reason that I can see—if you admit that the pink ballot is, to that extent, valueless—for keeping the election of members in the hands of the members of the Society, as at present.

On the other hand, the opportunity which the Board has of arriving at an accurate estimate of the candidate's character and abilities is so very much greater that it seems to me there is no choice in the matter, and I hope that the amendment will pass.

MR. RICKETTS.—Mr. Chairman, Mr. Crowell has stated one view of the question. The other view is this: That a great many members of the Society will not write or give their opinions of the candidates to the Board of Direction, partly because they would be unable, perhaps, to prove definitely their opinions of the man, and, secondly, because they are afraid that members of the Board of Direction would give to the candidates information which had been presented to the Board of Direction.

Now, gentlemen, that thing occurs. Within my knowledge, there has been, within the last two years, a man presented for membership in this Society who was unfit for the position. He was first sent out by the Board of Direction to be voted upon, and was blackballed. He was then sent out again on a pink ballot, and was defeated. He was not a fit member of the Society. He would have been elected, if the election had been in the hands of the Board. They sent it out twice, and the members would not receive him.

Now, that is the other side of that question. And I also know, of my own knowledge, that members of the Board have given information to candidates for membership in this Society—information which they had no right to give. Now, that is the other side of this question. I do not mean to cast any reflections on the Board of Direction of this Society, as a whole. I have been a member of the Board, and I am proud of it, and I do not believe there are any better men in any profession who could be collected together than the members of the Board of Direction of this Society; but I do not believe they give often sufficient consideration, as a Board, to the question; and I do not believe that a man in California, if a pink ballot is sent to him, will give very much more consideration to it than he does at present. I think it is a perfectly safe proposition to leave that matter in the hands of the members of the Society as a whole. (Applause.)

MR. O'ROURKE.—Mr. Chairman, I have been a member of the

Society for nineteen years, and I have just completed a term as a Director. During my term in the Board, when Professor Ricketts was there, I nearly always had the pleasure of being on the same side with him, and I am sorry to see that, having left the Board, he does not continue on the right side of the question.

THE PRESIDENT.—I am informed that it is twelve o'clock, and this is the hour at which the ballot is closed and counted by the tellers.

MR. O'ROURKE.—The speaker's objection seems to be largely due to the fact that the Board of Direction is a fallible body, and that, to some extent, the door is ajar, and now and then information will get out. Well, that may be true; I don't know but what it has gotten out. I can only say that, in regard to the general practice, everything that goes to the Board remains there and never gets beyond. It may be that there are individual instances where that has occurred; that will happen anywhere, and when we can get enough sense together to make a Board of Direction that is infallible and all-wise, then the Professor's idea probably will be reached in regard to what a Board ought to be; but as long as we cannot get any further than to select from among the body of the American Society of Civil Engineers the best men that are found in it, and make them the Board of Direction, we have got to put up with whatever difficulties may arise from the fact that they are not absolutely perfect.

Now, to get to the regular question: We are not discussing something that is proposed by the American Society of Civil Engineers as a new policy of the Society and a new way of electing its membership, and of being democratic or not being democratic—get away from that idea of democracy which seems to be so popular with some, and with all of us, I hope—but the only thing is we have got to find out how democratic we are. There is no body, of the description of this Society, which asks the general membership to elect its members.

This Society is probably six times larger than it was when I came into it, and the difficulty at that time was that the members were unable to vote intelligently, and that a few would get together, and, from prejudice, or for some other reason, shut out a man who was absolutely worthy. In spite of everything, the Society has grown, so that to-day, not to be a member of the Society, or to be rejected by the Society, by seven unknown voters out of two thousand, who may or may not be acting right, is a stigma; and the reason why people are rejected, very often, is not that they are unworthy, but simply because there are certain people who do not like them; and the more a man is known, while there are more people who like him, no matter how many may like him, they do not make any difference if there are seven who do not like him, however unworthy their motives, or however worthy, if you will, the other two thousand may be, their approval is of no value whatever.



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A MEMBER.—You would not get in now.

MR. O'ROURKE.—No, I would not have the least chance. One of the things that I would like to call attention to, in this amendment, is that it is a letter-ballot of the whole Board, and that three votes against any member reject. Now, that lets out all this thing about, "if the Board of Directors had the voice when this unworthy person was turned down in the pink ballot, he would have got in." It does not follow. There might have been three men on that Board who had sense enough to turn down a man asking to come in. That is not asking too much from this fallible Board which is not perfect. We may get three just men there. Who can tell?

What can be more ridiculous, Mr. Chairman, and Gentlemen, than to stand here and say that it is a democratic method that we have now, and that it ought to be kept up in spite of the fact that the experience of every other body, and our own experience, proves that it is wrong. Who votes and has a voice in favor of anybody? No, you can go to the Board of Direction with your troubles, if you have them, in regard to candidates, and the Board will carefully consider whether your troubles are real or not. You can go to your six bosom friends and say you do not like somebody, and he is rejected; and the Society stands helplessly by and sees him shut out. You can send out your pink ballots, and what do you get? You get ten or fifteen people who vote against every pink ballot, and then you get the great body voting on the pink ballot when they don't vote on the white ballot, and they don't vote on the pink ballot unless a special effort is made to bring out the vote.

I remember when the discussion was had, about ten years ago, on this pink ballot. It was supposed that when a wrong was done, everybody would be eager to right it. It has come to be so that not one-tenth of the members vote now for anyone; and the pink ballots don't have anything to do with it. They say: "We don't know." The result is that unless efforts are made to bring out the votes, less than 10% of the body votes, and 10% of that rejects. So, after all, with the pink ballot, unless you make an effort, 1% is a matter of rejection.

This thing of mistrusting your Board, and to have that mistrust expressed by a man who himself has been a member of the Board, and knows the absolute slavery of the membership of being a member of the Committee on Admissions—I never saw anything like it, gentlemen. I have never seen anything like the way in which the letters are weighed, and the evidence is taken against anybody. Unless there is the strongest appearance of injustice, and unfairness, and want of truth, in the objections that are raised against a man, the policy of that Committee on Admissions—and I have seen that Committee changed through three years—its policy is always to give the Society the benefit of the doubt against a man. In other words, the Society



will keep every one out who cannot prove his title clear, as far as the Board of Direction is concerned. How is it with the outside parties? The people who waste two cents on a white ballot that does not contain a blackball are simply *nil*; and most of them know it.

Now, take any body: Does the Institution of Civil Engineers elect its members through the general body? Do any of the large clubs do it? Do any of the small clubs, even, do it, without making trouble for themselves?

The only way you can consider a man justly, in view of the rights that every engineer professionally qualified has to membership in the Society, whether we like him or not, if he is worthy otherwise, that can be protected by the Board of Direction, and it cannot be protected by putting it into the power of any seven—sellers of material, who, to get an order, any old thing at all does for an excuse to keep a man out, so long as they don't have to stand behind it, and I say seven will answer. I say it is the opposite of democracy; it is the opportunity for unfairness, and it is the opportunity for sneakery. (Applause.)

MR. GREEN.—Mr. President, may I ask how the Board of Direction determines its action as to the sending out of either the white or the pink ballot. Isn't it done by a majority of the Board, the majority action of the Board? How many votes in the Board are sufficient to prevent the sending out of a pink ballot, or what is the action?

THE SECRETARY.—It depends upon the number of members present at a meeting.

MR. GREEN.—And the majority of those?

THE SECRETARY.—The majority of those. I might say that the difference, if you will allow me a minute, the difference between the action of the Board under this proposed amendment, as I understand it, and the present action of the Board, in the case of applicants for membership, is that the action is taken at a meeting now where five members constitute a quorum, and by a majority; whereas, under the amendment, this is by a letter-ballot of the whole body, as I understand the amendment.

MR. GREEN.—I am asking how the Board now decides ballots; I think it is done by a majority of the Board.

THE SECRETARY.—Not a majority of the Board, but a majority of those present.

MR. GREEN.—By a majority of those present. Then I would say to Professor Ricketts that it might be very likely that the Board, in sending out either the white or the pink ballot, may have voted unanimously on it, and that if a minority, or at least a sufficient minority in that Board, which, under the proposed amendment to the amendment, say, three votes, had existed, that white ballot would not have gone out in the first place, and probably the pink ballot would.

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The point I make is that, under the proposed amendment to the amendment, a small number of negative votes in the Board will defeat any candidate. That is not possible now. A small number of votes, under this proposition, would defeat any candidate, would it not?

THE SECRETARY.—Yes, sir.

MR. GREEN.—That would be a minority of the Board, if seven members were present. I was a member of the Committee, last year, which reported against the proposed amendment of this kind. I was the one minority member. It would, perhaps, be interesting for the Society to know that that Committee never held a personal meeting. There was but one other member upon the Committee with whom I was personally acquainted. The way we came to make the report was through a very little correspondence, and I did feel that some of my colleagues might not have had the opportunity to familiarize themselves with this question, as they would have had if we had got together and talked it over.

I believe that this proposed amendment is a most excellent thing, on general principles. Both Mr. Prout and the proposer of the amendment have stated my views of the thing very fairly. It is not a very important question, as far as the expense is concerned, but it seems to me that the Board of Direction has practically and entirely the whole thing in its own hands now, and when the majority of that Board decides to send out a letter-ballot, let it go out, and the members of the Society vote on it with what little light they have, which is very little, usually; and when they decide to send out the pink ballot, it is the same way: they have come to the best conclusion they can, by the majority, and then they have to throw the whole thing over to the Society to be acted upon with but very little knowledge, and very few votes come in. It seems to me to be a very clumsy arrangement, and that it would simplify matters very much, and be much to the advantage of the Society if the Board should attend to the whole matter. It would feel the responsibility more keenly. It can act upon the nominations for membership most intelligently, and it will not be obliged to throw anything upon the Society when unable to conclude the matter in a Board meeting unanimously.

GEORGE HILL, M. Am. Soc. C. E.—Mr. Chairman, there has been one criticism made which, in my experience, is not well founded. I know that, in my own experience, in obtaining admission to the Society, opposition was met which never dared show its head, and that opposition was kept up among the membership. It was simply a matter of personal prejudice, and was finally overcome. I have had other members of the Society request me to vote against members for admission, for reasons which I am very sure those men would not put on paper, and sign with their own names and submit to the Board of Direction; that is to say, for purely personal reasons in no way connected either

with the personal fitness of the candidate to be a member of the Society, or with his professional qualifications.

The Board of Direction will occupy the position of a jury, and will waive all good reasons against the promotion or the admission of a candidate. They are best fitted to perform that function, because membership in this Society is not and should not be gauged by the man's personal acceptability to the various members of the Society, but by his professional qualifications, and his personal cleanliness. This is not a social club, where those who are in it are to determine upon the availability of those who are to come in, according to their personal acceptability, but it is a Society, as has been stated, where the only qualifications are personal cleanliness and professional standing, and for that reason the personal element ought to be eliminated as far as possible.

This proposed amendment is nothing more than the logical development of the method of admitting members to the Society, which has been a matter of slow growth, year by year, modified from time to time, in order to meet the conditions as they arise. It has now reached the point where it should be the belief of every thinking member of the Society that the change is an absolute necessity in order to secure the best work of the Society for itself.

In regard to the action by the Board on the application of candidates, I know, of my own knowledge, that the Board does give consideration to the voice of the members. I know of a case where an applicant whose name was sent out on the blue list never got any further. What the action of the Board was, I don't know. I do know that I wrote out what I thought of that candidate, signing my name to it, and sent it to the Board, and I know that the name did not go out to the voters. Whether that was backed up by anybody else or not, I don't know. My objection to that man was simply on his professional qualifications.

At 12.15 P. M. Past-President J. James R. Croes took the chair.

ROBERT MOORE, President, Am. Soc. C. E.—Mr. Chairman, I cannot let a matter of this importance pass without having another proposition which has been made, in this regard, brought at least to the attention of the meeting. The matter itself is one of the very greatest importance. The method of selecting our membership is certainly one that cannot be exceeded in importance by any subject that can be brought before this body.

The present method, while, in the main, it has worked satisfactorily, I think, has not worked satisfactorily in all cases. There have been, undoubtedly, malicious and unjustifiable exclusions from the Society. I have not the experience that many of those who have served practically upon the Committee of Admissions have had, but I know that this is the fact. Now, the remedy for that, which is suggested

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by this amendment to the amendment, is to revolutionize completely the former plan, and to throw the whole matter into the power of the Board of Direction.

Now, there is another suggestion which, I think, was made to this meeting a year ago, which, so far as I know, was first brought before a meeting of the local members of the American Society of Civil Engineers at St. Louis, which was to solve the difficulty, not by throwing the election into the Board of Direction, but by increasing the number of negative votes required. Now, in a membership as large as ours, I think it may be admitted that seven votes, which is but a fraction of 1% of the total number of Corporate Members, is too small a number, and that it needs to be remedied in some way, and the suggestion at that time—and I think it is a suggestion which has been canvassed in the Board of Direction—was that the number be increased to approximately 1% of the total number of Corporate Members, which, at the present time, would be twenty or twenty-one.

Now, I think a great many members, perhaps not as well informed as some others, would prefer a method of that kind to one which is so entirely revolutionary as the one which has been suggested by Mr. O'Rourke's amendment, and I think that this plan ought to be brought to the attention of this meeting. This matter was considered by a Committee of the Board of Direction, I believe not approved by the Board of Direction, but a report was made which substantially embodies that idea, and, personally, it seems to me that it would be probably the best action to take at the present time. It seems to me that it would probably cure nine-tenths, if not the whole, of the malicious blackballing, which is now complained of, and which is sought to be remedied, and if so, it would, I think, be a safer remedy, and one which would greatly relieve the Board of Direction of the responsibility, which they certainly are not anxious to take, of bearing the whole burden of the election of members to the Society.

The gist of this proposed other plan is contained in this clause:

"The ballots shall be letter-ballots, in a form to be prescribed by the Board of Direction. They shall be mailed to each Corporate Member whose address is known, and shall state the date on which the ballot is to be canvassed, and which shall be not less than twenty days after the issue of the ballot. Twenty or more negative votes shall exclude from election."

If that twenty were made 1% of the Corporate Members, as at the time being, or at the time of the last list of membership, I think that it would go a long way toward curing the trouble which is now sought to be remedied.

MR. O'ROURKE.—Mr. Chairman, in relation to what Mr. Moore has just read, the report of that committee was made to the Board of Direction, and the reasons given by the committee were much the same as those given now by Mr. Moore for making that report. It



was not that they considered it the best action, but they considered it the action that would be most likely to meet the difficulty, and at the same time meet with the approval of the general body and of this meeting. In other words, they believed that what my amendment to the amendment embodies was the best. It was passed upon by the Board, and approved by the Board as a substitute for this action of their own committee, and, as I am no longer a member of the Board, it was thought that it would be perfect good taste in having it presented by me, not as being the action of the Board, but it was their belief that it was the proper thing to do.

Mr. Moore, himself, states that it is not the best thing to do, this election of members by an uninformed body, as it is absolutely impossible to inform that body as to the qualifications of anybody, and right was considered as something; but they had this belief, which I do not believe, even though this meeting votes against this amendment.

My belief is that the Society wants to do what is right, even when it is radical, and the right thing to do is what every other Society does, elect your members by a body which is qualified to do it, by the knowledge which is brought to them, and by the knowledge which they themselves possess, and that is why this suggestion cannot be considered; for, of course, we cannot consider an amendment to an amendment, because you have either to accept or reject that amendment to the original amendment proposed as it is offered, and if you don't want to do anything radical, and rather prefer to do something which is half right and partly radical, why it is up to you to do it that way. (Applause.)

C. F. ALLEN, M. Am. Soc. C. E.—It seems to me that the gentleman who has proposed the amendment to the amendment has come near proving too much. He rather protests that the Board of Direction ought to be trusted. Why doesn't he protest that the Society ought to be trusted? Why can't you trust the Society as well as trust the Board of Direction?

I believe you can, but the objection is urged that there are some bad members in the Society. How did they get there? They went by the Board of Direction, if they got there at all.

Now, there is no way of doing this thing right. There is no way of handling it, so far as I can see, in which the action will be satisfactory. If you entrust it to the Board of Direction, the work will not be efficiently done. Men will go by who ought not to go by. If you entrust it to the Society, men will be rejected who ought not to be rejected. There is no escape from those propositions, it seems to me.

Not many years ago, in talking upon this particular matter, I talked with a member of the Society who had been in the Board of Direction, the Chairman of the Board of Direction—a man in high



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esteem in the Society—and his criticism was that it was undesirable that the matter should be thrown into the Board of Direction; that, in his experience, the action of the Board of Direction at times had been such that it was unwise to put the whole matter into its hands. It certainly is true that cases, as he suggested, had gone by, had gone through the Board of Direction, that ought not to. Certainly, members have been at first rejected, and have been again rejected, when they ought not to have been rejected.

We then, substantially, meet the proposition, what shall we do? Shall we take the chance of shutting out a good man, or shall we take the chance of letting in a bad man? I believe that we want to resist the chance of taking in the bad man. I believe that it is a mistake, on the whole, to take the affair out of the hands of the members.

It is perfectly true, as one of the previous speakers has stated, that I, or other members, may be entirely satisfied, but it may be absolutely impossible for us to prove, that he is an undesirable member, and yet our instincts are so clear and right, upon the best motives, upon the best qualifications for membership, that the ballots ought to be cast against the candidate.

It is said that seven bad members may cause the rejection of a good candidate. Why can't five members, who are the only members who know an applicant—five bad members—why can't they put the man into the Society? Where does the Board of Direction get its information, except from those five men?

There are a good many sides to it, I believe, and we want to hesitate before we take the power from the hands of the individual members, who, locally, are able oftentimes to have facts, which are the proper thing as the basis of admission—some of the people, locally, may have facts that do not really come to the Board of Direction. The Board of Direction has a good deal to do; they are busy men; they are not able always to get at the facts definitely. (Applause.)

J. N. GREENE, M. Am. Soc. C. E.—Mr. Chairman, I want to ask Mr. O'Rourke, as a matter of information, how the Board of Direction gets information and knowledge as to candidates for this Society, and gets information which is definite enough, and positive enough, to settle this question whether a man shall be admitted or not?

Now, I cannot see, from the debate, as far as it has gone, any plan, and I ask Mr. O'Rourke, in having been a member, what is the *modus operandi* at present, if any, which is taken to find out the qualifications of a candidate when he asks to be admitted to this Society?

MR. O'ROURKE.—Mr. Chairman, the *modus operandi*, so to speak, is to send out a blue list, notifying the whole body of the Society of the application of the person for membership, and requesting confidential information. That is done to-day. That information goes to the Committee on Admissions, and I have known cases where four men, and

often more, were turned down by the Committee on Admissions at a single meeting, due to the evidence that was received as to the unworthiness of the applicant; and, further, if information is received against anybody which does not bear the stamp of truth on it, the Committee on Admissions, though they are busy men, go further into the matter. The name is put back, and put back, and put back, until they are fully satisfied. They take cognizance of the right of the good man to come in, as well as the right of the Society to exclude the bad, and that is something that cannot be done by the body at large, and that is something that it does not do to-day. It does not vote; it does not consider. Only those who have anything to say against anybody—and their saying is merely a black mark—those are the ones who really communicate anything to the election, and, further, Mr. Chairman, that is considered afterward by the Board.

Now, in the discussion, the point seems to be missed that, while to-day a majority of those present, voting in favor of a thing, will carry, though they may not be a majority of the whole Board, this amendment provides that all the information—of course, that is in the Board itself, to give information to the members—the Board as a whole will have to vote on every name that is brought up, and three members of the Board will be sufficient to exclude, voting in the negative.

MR. GREENE.—I was quite aware of the blue list and of the manner of sending it out, but what I want to get at is, if there is anything in the Board of Direction, aside from what Mr. O'Rourke has just stated, that would enable the Board to decide this question any more accurately or justly than it is being decided in this, it seems to me, too loose way we have now. Is there any other?

MR. O'ROURKE.—They take whatever evidence they get. It is up to the members to furnish the Board with objections, and that is done all the time. It is a great mistake to think that every name that goes out on the blue list comes out on the white list afterward—it is far from that.

MR. GREENE.—It seems to me to be evident to every member of the Society that it is a very embarrassing thing, and a very difficult thing, for him to take a blue list, about which he may know something, or little, or much, or, perhaps, not anything, and he hesitates before he discriminates against a man and sends information to the Board, unless he has positive knowledge. It would not be fair for him to do it unless he had.

Now, it seems to me, the difficulty in this matter is that this thing is not concentrated in any workable, proper manner. It seems to me that there ought to be a committee of this Board of Direction whose business it shall be, confidentially, to ascertain the facts, and whose business it shall be to keep everything of that kind that they get into

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their possession positively and absolutely to themselves, and not as the gentleman over there has described, that he has known of cases where the Directors have given out information by which men were rejected, which is a very unjust thing, as we all agree.

Now, this matter of getting into this Society as a member should not be looked upon as so small a thing as not to attract anybody's attention. It is a great thing to be a member of this Society, if men would only look at it that way.

Now, what is our position in this matter? We are entrusted, more than any other body of men on this continent, with the expenditure of capital for the improvement of the public works of this country and the country's general good, and we are called upon, and should be held right up to the mark, that we make good that expectation of the public, because the man who takes a position as an engineer and disburses millions of money should be, beyond any question, rock-bound in his integrity, and naturally he should be well advised, well educated by experience, and show his ability to cope with the subjects that may come before him.

I make the statement here, and I believe it is true, that, for two reasons, more money has been wasted on the public works of this country in the last fifty years than it would take to pay the public debt of this country when our Civil War closed. What are those two reasons? They are very lucid, and very short, and very nubby. First, the brains and ability and knowledge of the business that the man who has the matter in hand, whether he is able to cope with it and do it properly, and the next is, whether he has got such integrity at rock-bottom that he will do justice between the parties, let what will come.

Now, we know that men have got into such positions in this country; for instance, this matter in Savannah, a few years ago, by a United States officer, educated, I believe, at West Point, and now serving time, in a western penitentiary, for stealing. There was a man, educated at his country's expense, and it seems to me the only mistake that was made in that man's case was that he had not gone to State's Prison before he went to West Point; then he could not have done this mischief.

There ought to be some way in which this Society can exact from the candidates who want to come into it facts and information sufficient to give the Board of Direction—or whoever is left to decide this question of who shall come in and who shall stay out—absolute knowledge enough so that they will feel that, conscientiously, they are safe in letting a man in, or they are acting exactly as honestly in saying that he cannot come in.

It seems to me, Mr. Chairman, that something of that kind should be done in the Board of Direction, if this amendment passes. Now, what is everybody's business is nobody's business, is an old saw—

older than any of us here—and if this amendment be passed, and the Board then appoints a sub-committee whose duty it shall be to do that, and make it their business to see to it, it seems to me that this question, and this trouble, will be largely removed, and very easily; but I do not see how it ever can be done, in the *modus* under which we are now proceeding.

MR. RICKETTS.—Mr. Chairman, I would like to ask a question. It is assumed that members of the Board of Direction who may reside in California are to vote intelligently on each application. Suppose a member shows a letter to the Board in which he says that he knows or believes that a certain applicant is a blackguard and a rascal, do I understand that, under this amendment, the Board intends to print that, and send it out through the United States mails to the different members of the Board throughout the United States? And, if they don't do that, how can the various members of the Board, distributed throughout the United States, vote intelligently in any case?

MR. O'ROURKE.—The best answer to that, Mr. Chairman, is to state what is the practice at present in the Board. All such communications, and all preliminary considerations of an applicant, are considered by a committee similar to the committee that Mr. Greene has spoken of, who take all these facts into consideration, and when the name comes before the Board they recommend either that he be accepted or rejected. Usually, the rejection follows in any case. I have never known of a name to go by that committee, so that, even if the Board was present, and even if they had this stuff piled up there in a basket before them, they would never even ask for it, or ask to see it, if the Committee's report on the man who is not favored by them is presented; I have never known of a case that it was not so considered by the action of the Board. There may be a few instances, of course, but I am probably proceeding too far; but I am talking about the general practice. The confidence of the Board in this Committee is so great that they rarely go beyond that, if there is any reason to believe that he is not worthy. No matter what would be the proceeding under this amendment, I would say that whenever any real occasion arose for communicating to everybody on the Board, means will be found to do it. I think we can trust the Board for that.

There is no doubt about it that the only way you can sift a thing like that is to sift it through a committee, and once your committee has given its conclusions on the matter, if you want to go behind the committee, then it is time to go about it.

MR. RICKETTS.—In other words, this local committee, which must necessarily be a local committee, is to determine who shall be members and who shall not be members of the Society. (Applause.)

E. P. NORTH, M. Am. Soc. C. E.—Mr. President, I listened with a great deal of pleasure to Mr. O'Rourke's description of the proceedings before the Committee on Admissions. It does not quite agree with a



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little bit of experience I had, I think before Mr. Ricketts was a member of the Board.

I saw in the blue list the name of an applicant who, I thought, was unfit for membership. I wrote to the Board of Direction that, before his name was passed to ballot, I might be further communicated with, as I would like to make a personal communication. The next month the name came out on the ballot list. I inquired about the thing, and, while I cannot make any official statement, I think I am justified in mentioning my suspicion that the name was examined, one among over sixty, on a very hot September Tuesday, and the fact was that they did not get to my letter at all, but passed the man among that number, as I take it.

Now, that is an extreme case, I am perfectly willing to admit, and I wish to urge that it is an extreme case; but I wish to say to the members of this Society that if this proposed change in the Constitution is made, one provision against the admission of unworthy members is swept away. It does not make much difference to the older men in the profession what reputation a young man has, but a young man who is looking for a place, and says he is a member of the American Society of Civil Engineers, is very severely handicapped by the knowledge that another member of the Society is unworthy of the name, either of a civil engineer or a man. (Applause.)

G. F. SWAIN, M. Am. Soc. C. E.—Mr. Chairman, I am heartily in favor of Mr. O'Rourke's amendment. I hope it will be adopted. I believe in concentrating responsibility, and I do not know of any better place to concentrate responsibility than upon the Board of Direction of this Society. It is the way that every large corporation does business; it is the way that a great many of the large clubs, if not all of them, and many of the professional societies elect members.

I think that we might trust the Society, as Professor Allen suggests, if the Society had information, and if the Society, and every member of the Society, or every seven members of the Society, would act squarely. I do not believe in giving seven members of the Society an opportunity to stab a man in the back for personal reasons. If there are seven members of the Society who think that a man ought not to be admitted, they certainly can bring information enough into the possession of the Board of Direction to enable that Board to form a fair opinion of the justice of their reasons.

I think that it must not be lost sight of that the proposed amendment will change the present mode of procedure of the Board. Five members of the Board now constitute a quorum, I believe, and three, therefore, would enable a meeting of the Board to pass a candidate for ballot. That is the way in which, perhaps, some unworthy men have become elected, have been passed to ballot, as Professor Allen states.



The mode of procedure proposed by Mr. O'Rourke would require the Board of Direction to vote by letter-ballot. I do not see that there is any difficulty, as Mr. Ricketts seems to think, in getting information to the various members of the Board in regard to the unworthiness of certain candidates. If a member of this Society knows that a candidate is a blackguard, and writes to the Board, giving his information, it is just as easy to write to the various members of the Board and give them the facts. There is no difficulty about that.

I believe in concentrating responsibility in the Board, and I think very likely the Board would modify, to some extent, its procedure. Responsibility always makes a man more careful. The Board is very careful now; I know from experience how much care is taken by the Board on the admission of candidates, and how carefully they consider every candidate. I cannot conceive at the present time of any letter from Mr. North not having been given great consideration. I don't know how it was. It was many years ago, perhaps; but I know how it is at present, and I, therefore, am strongly in favor of the amendment of Mr. O'Rourke. (Applause.)

MR. NORTH.—I would like to ask, before the Professor sits down, definitely, if it is much better to allow three or five men to stab a man in the back than seven? It really comes to the Board of Direction, a smaller number of Directors than is required now, preventing absolutely a man's election. The Directors are taken from the main body of the Society, and I do not understand that they are much more reliable than those of us who are not Directors, and are fully as able to stab a man, I take it (laughter).

MR. GREEN.—It is a great deal safer for the Society to reject a good man this year, if he can be admitted later, when more information about him can be secured than could be had in the first place, than it is to let an unqualified man come in. If there is anything at all of value to the members, or anything at all in membership in the Society, it should be the standing of its members as good engineers, and if an unworthy, unqualified man gets in, he is in there to stick, and you cannot get him out, but you can very easily put in a qualified man who has been passed over the first year for lack of information, or because someone wishes to stab him in the back, and elect him after a while.

I think the Board of Direction can be entirely trusted in this business, and if five members, only, constitute a quorum before the letter-ballot was sent out to all the members to vote upon the candidate, and it happens to be found that three out of those five vote against him on the spot because there is some question about the candidate, it is not necessary to send out the ballots to all the membership. It seems to me that we are straining at a gnat and swallowing a camel. Mr. Rickett's case has been entirely taken care of and disposed of in

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the particular way that it came up, if the minority who may have voted against the candidate at that time had been three in number.

I believe, as do many others, in holding up to a very high standard the candidates for membership in the Society. I think that too many men get in now who are lacking in the qualifications that they ought to have; they might wait a little while. A good many young fellows on reaching the age of thirty apply for membership and try to get in, but it is better for the Society that the Board of Direction should scrutinize these applications with considerable care, and, in my experience, it is safer for them to reject them, if necessary; and I say that it is a great deal better for the Society to reject, once in a while, a very well qualified man, a desirable man, than it is to make a mistake and elect an unqualified man.

(The President resumed the chair.)

T. S. WHITE, M. Am. Soc. C. E.—I would like to ask the President one question in regard to the amendment that he spoke of and suggested a little while ago, as to increasing the number necessary to exclude. Have there ever been twenty negative votes cast against any member?

G. I. BAILEY, M. Am. Soc. C. E.—Mr. President, in regard to this amendment to the amendment proposed by Mr. O'Rourke, I wish to say that I am opposed to it, and that several members of this Society, who do not live in New York, and whose associations in the Society are confined to receiving its publications, and the communications mailed from the Secretary's office, and an occasional blue list and ballots to members, are opposed to it.

If abuses have been made in the election of members to this Society, I think the thing to do is to get at those abuses and stop them. If you cannot expect the members to vote intelligently and properly for admittance of candidates to their own membership, I do not see how you can cure that evil by allowing those same members to vote for members of the Board of Direction, and then shifting that responsibility over to that Board.

I believe the suggestion made by yourself, or by some one before, that if a committee of seven in the Society may keep out members, then that number should be enlarged, and, as you say, a percentage of the whole membership of the Society, or else a percentage of the whole number of votes cast, should exclude. The pink ballot does correct that evil of seven, as has been demonstrated a number of times in the last few years, but for these up-country members, of whom I am one, we like to have something to say, occasionally, in regard to the Society, and feel perhaps like the Americans of a hundred and thirty years ago, when they had the little tea-party up around Boston. We are all taxed for the Society, we pay our dues, and we want something to say for it, and if we are not competent to pass upon our own members, I

do not believe in appointing some nurse to do it for us; give us all a chance. (Cries of Question.)

THE PRESIDENT.—The question is called for. The question is upon the amendment to the amendment offered by Mr. O'Rourke, which, I think, it is not necessary to read. Those who are in favor of the adoption of the amendment to the amendment proposed by Mr. O'Rourke will signify by saying aye; contrary, no.

The Chair is unable to decide.

G. S. MORISON, Past-President, Am. Soc. C. E.—Before any further vote is taken, Mr. President, I should like to know what this amendment to the amendment is?

THE PRESIDENT.—Well, it is an amendment which, in effect, throws the election of members wholly into the Board of Direction.

MR. MORISON.—May I ask to have that read?

THE PRESIDENT.—The reading of that amendment is asked for, and I will ask the Secretary to read it.

(The Secretary read the amendment to the amendment.)

THE PRESIDENT.—Having heard the amendment to the amendment, proposed by Mr. O'Rourke, all those who are in favor of it will signify by rising and standing until counted.

(The Secretary announced sixty-eight votes.)

MR. ALLEN.—I rise to a point of order. I would like to know what the situation is as to those men who are standing, not from their seats, but behind the seats in the rear of the room: are those members properly counted in the room or not?

THE SECRETARY.—I counted everybody standing in the room: not outside of the room.

THE PRESIDENT.—Those who are opposed to the amendment will rise.

(The Secretary announced eighty-eight votes.)

THE PRESIDENT.—The amendment is lost. The question now recurs upon the amendment as it was heretofore read, the amendment which you have received in print.

THE SECRETARY.—Allow me to say, Mr. President, that this meeting can do nothing with that amendment except to amend it. Unless that proposed amendment is amended by this meeting, under the Constitution, it goes to letter-ballot of the Society.

THE PRESIDENT.—The Secretary is correct. The proposed amendment having failed, the original amendment goes to the Society for letter-ballot. If there is no amendment offered to this, it will go out in the form in which it is. This is simply to the effect that the Board of Direction may classify; it has no bearing upon the number of negative votes that may be necessary to exclude.

MR. KNAP.—I wish to ask for information, now that that amendment has been voted down, is it in order to present another amendment?

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THE PRESIDENT. —In the nature of an amendment to this; yes, sir.

MR. KNAP.—I am sorry I have not got it written down, but I would like to make an amendment to the amendment to this effect, that, in order to exclude, the number of negative votes should be 1% of the Corporate Membership at the last Annual Meeting, or at the time of the last Annual Report; 1%, which would be, as the President has stated before, about twenty at the present time. Instead of seven, I wish to substitute the number twenty.

THE PRESIDENT.—That is, you wish to substitute 1 per cent.

MR. KNAP.—Twenty, or 1%, which will be at this time about twenty.

MR. SWAIN.—I second the motion.

THE PRESIDENT.—The amendment is seconded and is now before you, which amends Section 4 of Article III, making it 1% of the Corporate Membership.

THE SECRETARY.—As of the 1st of January of each year?

THE PRESIDENT.—Yes; necessary to exclude.

MR. KNAP.—I would state, in addition to that, that when the number seven was decided upon, as I understand it, there were about seven hundred members in the Society, and that was really about 1%, but twenty is now practically the same percentage of the Society as seven was at that time.

THE PRESIDENT.—The amendment is now before you for discussion, gentlemen.

ALLEN HAZEN, M. Am. Soc. C. E.—It seems to me that there may be a great many men proposed for membership of whom there would not be twenty men who know well enough about their position and standing to pass intelligently upon this point, and in that respect twenty to-day may be a much more liberal allowance than seven, which was 1% at the time it was adopted, if that were the case. And I question if twenty is not a larger number than we can afford to give at the present time, even if seven is too small. I am not one of those who feel that to be defeated by seven votes is anything to be ashamed of, or to feel unduly. There is a satisfaction in having gone through the pink ballot and feeling that the great majority of the members of the Society are behind you.

MR. WHITE.—Just in regard to that point that Mr. Hazen has made, the question arises again as to how many votes were ever cast against a man, and whether it is possible that anybody would ever be excluded if it required twenty votes to exclude him as a member.

THE SECRETARY.—There have been twenty votes cast against a candidate, and there has also been one voter who has voted against all the candidates on a ballot list, on which I think there were forty-six.

MR. HILL.—As I understand it, Mr. President, 1% of the Corporate Membership, according to the list as handed out to-day, is only about



seventeen voters, and seventeen votes are considerably less than twenty. It seems to me that the real effect of this proposed amendment is to carry into effect by indirection the amendment which has just been voted down, because it seems to me that it would rarely happen that such a number of adverse votes would be cast. It seems to me that that is a very exceptional number. In this particular case the men who know objectionable characteristics on the part of the candidate, in order to make that objection effective, must vote through the Board of Direction, so that the effect will be, if we feel that a candidate is objectionable, we must go to the Board and stop him there, feeling certain that it will be difficult to get the requisite number of voters.

(Calls for the question.)

F. W. HODGDON, M. Am. Soc. C. E.—Mr. Chairman, this question seems to be entirely out of order. The question of the number of negative votes which will come up is an entirely new question. It is not an amendment to the amendment which is to go before the Society at the present time. That simply refers to the application of the applicant. This is the method of election of the applicant, and should come in as an entirely new amendment and be presented to the meeting, and be presented to the Society for discussion. (Applause.)

(Calls for the question.)

MR. CROES.—I think, Mr. President, that this is entirely germane to the amendment. This resolution making the change in the Constitution is offered, and this changes two or three words of it, and that is all.

MR. HODGDON.—Not germane to the subject, but to the other amendment.

MR. CROES.—It changes two or three words in that; it makes it twenty instead of seven, that is all.

MR. HODGDON.—That question is not up in the amendment.

MR. CROES.—The amendment is this amendment to the Constitution, and this is an amendment to that amendment, and it is perfectly proper.

(Calls for the Question.)

THE PRESIDENT.—That raises a question which it is a little difficult for me to decide off-hand. Both are amendments to Article III, though not to the same section of Article III.

THE SECRETARY.—The language of the Constitution is, that an amendment may be amended in any manner pertinent to the original amendment.

MR. HODGDON.—What section is it that it is proposed to be amended?

THE PRESIDENT.—It is proposed in the original to amend Section 3, Article III.

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MR. HODGDON.—In relation to the proposed amendment to that, where we had the proposed amendment of Mr. O'Rourke, that came up, because it was proposed to amend Sections 2 and 3 of Article III; but the amendment proposed by Mr. Knap amends Section 4 of Article III. I just raise the point of order that it is not germane.

THE PRESIDENT.—I think I shall have to decide that it is not in order.

Resolution  
in reference  
to the late  
Abram S.  
Hewitt.

MR. MORISON.—Mr. President, is there any other business to come immediately before the meeting? If not, I would like to offer a resolution. It has not been the custom of this Society to pass special resolutions in relation to special men, but it seems to me that the coincidence of this meeting in connection with the history of this city, and of the country, for a great many years, calls for some special action now.

Some of us were late in coming to this meeting to-day, and the reason for that was because we cared more about rendering the little respect we could to one whose memory the whole engineering profession has honored than for attending to the business here this morning, important though it be.

At precisely the same hour for which this meeting was called the last services were held over the man who, for a long time, we have looked upon as New York's first citizen, and who, if any man outside of the profession has ever done much for engineers, he has certainly done it. My own personal acquaintance with him began about thirty years ago, and for twenty years I have felt that, if there was any subject upon which I needed especially sound advice and help, he was the man for me to go to. I think there are many of us who have felt in that same way.

I therefore offer the following resolution:

*Resolved*, That the members of the American Society of Civil Engineers, assembled in their Annual Meeting at the hour when the last sacred rites were performed over the mortal remains of Abram S. Hewitt, desire to place on record a brief recognition of the debt which so many of them individually, and all of them as a profession, owe to him who was for so many years New York's first citizen.

While he always disclaimed being an engineer, he had the mind and spirit which mean more than the actual professional name. While not enrolled among their numbers, his whole life, as a citizen, a manufacturer and an educator, was devoted to those interests which have made the engineering profession possible.

Few cities have had so patriotic a citizen. No profession has had a warmer friend.

(Applause.)

R. W. HUNT, M. Am. Soc. C. E.—I desire the privilege of being a seconder to that resolution, and I think, sir, we all feel it fitting that this Society should pass such a resolution. While Mr. Hewitt was not a member of our own organization, he was a Past-President of a sister

national society, and, surely, if ever a man served his country, and served his country in a way that was effective, it was he.

In looking at the progress of the world, the advancement of mankind, and those who have been connected with it, it is difficult to draw lines showing exactly where such a one's influence has extended and ended.

So, with Abram S. Hewitt, we cannot exactly mark out the great industrial advancement of the United States, or the progress, or the better condition of its citizens that was brought up to a certain point by him; but surely no man has lived in his generation who has done more to sweep on that tide. He has given and done the things that were best calculated for the true advancement and the true benefit of his fellow men, and now, sir, God has made the just man perfect. (Applause.)

THE PRESIDENT.—Gentlemen, you have heard the resolution offered by Mr. Morison, and so ably seconded by Mr. Hunt. All in favor of its adoption will signify by rising.

It is a unanimous vote.

THE SECRETARY.—I have the report of the tellers.

THE PRESIDENT.—If there are no other resolutions to offer—

J. A. OCKERSON, M. Am. Soc. C. E.—I would like to offer a resolution.

THE PRESIDENT.—Well, that will be in order.

MR. OCKERSON.—*Resolved*, That it is the sense of this meeting that the American Society of Civil Engineers should co-operate with the officers of the Louisiana Purchase Exposition Company, in the inauguration of an International Congress of Engineering, to be held in St. Louis, during the Exposition period of 1904, and be it further

International  
Congress of  
Engineering.

*Resolved*, That the Board of Direction be, and is, hereby, authorized and requested to take such steps as may be necessary to carry out the provisions of the foregoing resolution.

I might say, gentlemen, in this connection, that the Exposition Company is making very generous provisions for the scientific congresses, and, of course, it is important that the American Society of Civil Engineers should take a leading part in the engineering congresses. For my own part, I should be very glad to have the Society make use of my department at the Exposition in any way possible to help this matter along. The use of stenographers, typewriters, and other members of the force is at your service.

The resolution was duly seconded.

THE PRESIDENT.—Is there any further discussion upon it? I will ask for the vote. Those in favor of the adoption of the resolution, which you have just heard read, will signify by saying aye; those opposed no.

Carried.

THE PRESIDENT.—If there are no further resolutions, the next order of business will be the report of the tellers.

Report of  
Tellers.

THE SECRETARY. The tellers' report is as follows :

**Report of Tellers Appointed to Canvass the Ballot for the Election of  
Officers at the Annual Meeting, January 21st, 1903.**Mr. Chairman: Your Committee, appointed to canvass the ballot  
for Officers, reports as follows:

Total number of ballots received.....	710
Not entitled to vote.....	1
Without signature....	13
Voted nominating blank.....	1
	— 15
Counted and found correct.....	695

*For President:*

Alfred Noble .....	691
Edward A. Bond .....	1
F. W. Cappelen.....	1
Henry S. Haines.....	1

*For Vice-Presidents:*

L. F. G. Bouscaren .....	684
James D. Schuyler.....	687
O. F. Nichols.....	2
Wm. M. Black.....	1
Addison M. Scott.....	1
Howard G. Kelley.....	1
Thomas H. Johnson.....	1
D. C. Henny.....	1
W. H. Kennedy.....	1
W. F. Tye.....	1

*For Treasurer:*

Joseph M. Knap.....	693
Palmer C. Ricketts.....	1

*For Directors:*

Alfred Craven.....	686
Joseph O. Osgood.....	684
George S. Davison.....	676
E. C. Lewis.....	672
Hunter McDonald.....	679
Elwood Mead.....	671
C. E. Grunsky.....	3
J. M. Johnson.....	2
J. B. Lippincott.....	2
H. M. Wilson.....	2



David E. McComb.....	1
R. C. McCalla.....	1
Chas. H. Graham.....	1
B. S. Wathen.....	1
A. M. Scott.....	1
J. C. Guild.....	1
J. A. Ockerson.....	1
Jos. Ramsey, Jr.....	1
Geo. S. Webster.....	1
Arthur L. Adams.....	1
D. C. Henny.....	1
W. H. Kennedy.....	1
Edward B. Taylor.....	1
Louis Y. Schermerhorn.....	1
F. A. Molitor.....	1
C. L. Harrison.....	1
D. W. Lum.....	1
James B. Atkinson.....	1

GEO. C. STODDARD.

C. D. POLLOCK.

*Tellers.*

JANUARY 21ST, 1903.

THE PRESIDENT.—Gentlemen, you have heard the report of the tellers, and with this election your present President retires. I cannot do so, however, without expressing to you and to the Society at large my thanks for the compliment which you have paid me in choosing me as your President, and further extending my congratulations to the Society upon the great prosperity which this Fiftieth Anniversary Meeting now witnesses; and when we see what we do see here before us, a large Society gathered in a house of its own, and compare it with the small beginning of the Society fifty years ago, I think we see that there has been planted here a very vigorous plant, and we may be sure that the next fifty years will witness a Society which will be of the utmost importance, not only to this profession, but to the whole country.

Remarks by  
Past-President  
Molitor

I will ask Mr. Morison and Mr. Croes to conduct the new President to the Chair.

ALFRED NOBLE, President, Am. Soc. C. E.—Gentlemen of the American Society of Civil Engineers: I appreciate very deeply the honor of the election to the Presidency of this Society, and this cordial greeting which you have been good enough to accord me. This Society is the best exponent of the profession of engineering on this hemisphere. Of the four great national societies, it is the one which seeks to embrace in its ranks all branches. Nine times in ten the engineer

President  
Noble  
introduces

must stand or fall on the simple issue of the performance of duty. On this issue, I perceive, with some alarm, that I must hazard what I prize most highly, the continuance of the good opinion of my professional brethren. In return for the honor which you have been good enough to bestow on me, I can only promise to regard the responsibilities I am about to assume as commensurate with the honor they imply, and to discharge the duties which I gratefully assume to the best of my power. (Applause.)

Memorial Tree THE SECRETARY.—Mr. President, I have one letter which I omitted  
at Mount Vernon, to read, and with your permission I will read it now.

ST. LOUIS, MO., JAN. 19, 1903.

MR. CHARLES WARREN HUNT,  
*Sec'y. Am. Soc. Civ. Engineers,*  
*New York.*

Dear Sir:

I hereby report to the Society that, in pursuance of the resolution passed at the last Annual Convention in Washington, I have had an oak tree planted at Mount Vernon, as a memorial of the visit of the Society in May last.

In the execution of this work, I have had the invaluable assistance of Mr. Gifford Pinchot and Mr. George B. Sudworth of the Bureau of Forestry and Mr. Harrison H. Dodge, Superintendent of the Mount Vernon Estate, and the thanks of the Society are due to these gentlemen.

Yours very truly,

ROBT. MOORE,  
*President.*

MR. MOORE.—I move that the Secretary be instructed by this meeting to extend the thanks of the Society to these gentlemen whom I have named. They have executed, with great skill and fidelity, this commission which was placed on them, and, I may say, without any cost to the Society. I think that the vote of thanks is due to them.

The motion was duly seconded and carried.

After several announcements by the Secretary as to features of the programme for the meeting, the meeting, on motion duly seconded, was adjourned.

## EXCURSIONS AND ENTERTAINMENTS AT THE FIFTIETH ANNUAL MEETING.

**Wednesday, January 21st, 1903.**—After the business meeting, lunch for about 450 members was served at 1.30 p. m. in the Lounging Room. At 3 p. m. a large party, under the guidance of Alfred Craven, M. Am. Soc. C. E., Division Engineer, visited and inspected the tunnel of the Rapid Transit Railroad, between Sixtieth and Forty-second Streets. The station at Broadway and Sixtieth Street, and various portions of the tunnel were lighted for the occasion. Smaller parties visited other parts of the work, in Harlem, on Park Avenue, at the City Hall, etc., during the afternoon.

At 9 p. m. there was a Reception, with dancing, in the Society House, at which the total attendance was about 375.

**Thursday, January 22d, 1903.**—At 10 a. m. the steamer *Valley Girl* (kindly furnished for the occasion by John H. Starin, Esq., and General Howard Carroll) with about 400 members and guests, including many ladies, left the Recreation Pier at the foot of East Twenty-fourth Street for an excursion. By invitation of Hon. Gustav Lindenthal, M. Am. Soc. C. E., Commissioner of Bridges, the party visited the site of the Blackwell's Island Bridge (No. 4) and inspected the masonry piers, on Blackwell's Island and at Ravenswood, in course of construction. Lunch was served on the boat while on its way down the river, and a stop was made at Hoboken to inspect the new fire-proof piers which are being constructed by the North German Lloyds Steamship Company. The party was landed at the pier at the foot of West Thirty-fifth Street, New York, at about 5 p. m.

In the evening there was an informal "Smoker" at the Society House, about 400 members and guests being in attendance.

The following list contains the names of 396 members, of various grades, who registered as being in attendance at the Annual Meeting. This list is incomplete, on account of the failure of many members to register, and it does not include the names of any of the guests, of the Society or of individual members:

Abbot, F. W. . . . .	New York City	Bacon, J. W. . . . .	Danbury, Conn.
Abbott, E. L. . . . .	New York City	Bailey, G. I. . . . .	New York City
Aiken, W. A. . . . .	Pittsburg, Pa.	Baker, E. B.	Morgantown, W. Va.
Allen, C. A. . . . .	Worcester, Mass.	Barnes, W. T. . . . .	Boston, Mass.
Allen, W. A. . . . .	Maurer, N. J.	Bascom, H. F. . . . .	Allentown, Pa.
Ashbridge, R. I. D.		Basinger, J. G. . . . .	New York City
	Philadelphia, Pa.	Belden, E. T. . . . .	Middletown, Conn.
Atkins, H. B. . . . .	New York City	Belknap, W. E. . . . .	New York City
Auryansen, F. . . . .	New York City	Bellinger, L. F. . . . .	Brooklyn, N. Y.
Aus, G. . . . .	New York City	Belzner, T. . . . .	New York City

- Benschel, J. A. . . . . New York City  
 Benton, L. S. . . . . New York City  
 Benzenberg, G. H. Milwaukee, Wis.  
 Berg, W. G. . . . . New York City  
 Bettes, C. R. Far Rockaway, N. Y.  
 Bengler, E. J. . . . . Boston, Mass.  
 Bishop, G. H. Middletown, Conn.  
 Bissell, C. T. . . . . New York City  
 Bissell, H. . . . . Boston, Mass.  
 Boller, A. P. . . . . New York City  
 Boller, A. P., Jr. . . . . New York City  
 Bonzano, A. . . . . Philadelphia, Pa.  
 Booth, W. F. . . . . New York City  
 Bouscaren, G. . . . . Cincinnati, Ohio  
 Bowman, A. L. . . . . New York City  
 Bramwell, G. W. . . . . New York City  
 Breuchaud, J. . . . . New York City  
 Brinkerhoff, H. W. New York City  
 Bryson, A. . . . . Reading, Pa.  
 Buchholz, C. W. . . . . New York City  
 Buck, H. R. . . . . Hartford, Conn.  
 Buck, L. L. . . . . New York City  
 Buck, R. S. . . . . Montreal, Canada  
 Burdett, F. A. . . . . New York City  
 Bush, E. W. . . . . Hartford, Conn.  
 Butts, E. P. . . . . Springfield, Mass.  
 Carney, E. J. . . . . New York City  
 Carr, A. . . . . New York City  
 Carter, A. E. . . . . New York City  
 Carter, Shirley . . . . . Norfolk, Va.  
 Cattell, W. A. . . . . New York City  
 Chambers, R. H. . . . . New York City  
 Chase, F. L. . . . . New York City  
 Chester, J. N. . . . . Pittsburg, Pa.  
 Christian, G. L. . . . . New York City  
 Christie, G. B. . . . . Chicago, Ill.  
 Clapp, O. F. . . . . Providence, R. I.  
 Clark, G. H. . . . . New York City  
 Clark, J. A., Jr. East Orange, N. J.  
 Clark, L. V. . . . . Philadelphia, Pa.  
 Clarke, St. John . . . . . Bogota, N. J.  
 Codwise, E. B. . . . . Kingston, N. Y.  
 Cogswell, W. B. . . . . Syracuse, N. Y.  
 Colby, S. K. . . . . New York City  
 Collier, B. C. . . . . New York City  
 Collingwood, F. Elizabeth, N. J.  
 Conrow, H. . . . . New York City  
 Cook, J. H. . . . . Paterson, N. J.  
 Cooper, S. L. . . . . Yonkers, N. Y.  
 Cooper, T. . . . . New York City  
 Copeland, W. R. Philadelphia, Pa.  
 Cornell, J. N. H. . . . . New York City  
 Corthell, A. B. . . . . New York City  
 Coverdale, W. H. . . . . New York City  
 Crane, C. A. . . . . New York City  
 Crane, F. E. . . . . Amsterdam, N. Y.  
 Craven, A. . . . . New York City  
 Crehore, W. W. . . . . New York City  
 Creuzbaur, R. W. . . . . New York City  
 Croes, J. J. R. . . . . New York City  
 Crowell, F. . . . . New York City  
 Cuddeback, A. W. Paterson, N. J.  
 Cudworth, F. G. . . . . New York City  
 Davies, J. V. . . . . New York City  
 Davis, A. L. . . . . New York City  
 Davis, Chas. . . . . Allegheny, Pa.  
 Davis, R. B. . . . . Boston, Mass.  
 Davison, G. S. . . . . Pittsburg, Pa.  
 Dawley, E. P. . . . . Providence, R. I.  
 Dean, L. . . . . Taunton, Mass.  
 Deans, C. H. . . . . New York City  
 Deans, J. S. . . . . Phoenixville, Pa.  
 Devin, G. . . . . New York City  
 De Witt, P. H. . . . . New York City  
 Diebitsch, E. . . . . New York City  
 Dorrance, W. T. . . . . New York City  
 Dunham, H. F. . . . . New York City  
 Easby, M. W. . . . . Philadelphia, Pa.  
 Ehle, B. . . . . East Creek, N. Y.  
 Ellis, J. W. . . . . Woonsocket, R. I.  
 Erlandsen, O. . . . . New York City  
 Evans, J. M. . . . . Brooklyn, N. Y.  
 Evans, L. H. . . . . New York City  
 Fernstrom, H. . . . . New York City  
 Fisher, C. . . . . Trenton, N. J.  
 Fisher, E. A. . . . . Rochester, N. Y.



- Fitch, C. L. . . . . Brooklyn, N. Y.  
 Francis, G. B. . . . . New York City  
 Francis, H. N. . . . Providence, R. I.  
 Frazee, J. H. . . . . New York City  
 French, A. H. . . . . Brookline, Mass.  
 French, A. W. . . . . Worcester, Mass.  
 French, J. B. . . . . New York City  
 Frost, G. S. . . . . New York City  
 Fuller, A. D. . . . . Boston, Mass.  
 Fuller, F. L. . . . . Boston, Mass.  
 Fuller, G. W. . . . . New York City  
 Fuller, W. B. . . . . New York City  
  
 Gartensteig, C. . . . . New York City  
 Gifford, G. E. . . . . New York City  
 Gillespie, R. H. . . . . New York City  
 Goad, C. E. . . . . Montreal, Canada  
 Goodnough, X. H. . . Boston, Mass.  
 Gould, E. S. . . . . Yonkers, N. Y.  
 Gowen, C. S. . . . . Ossining, N. Y.  
 Graham, C. H. . . . . New York City  
 Grant, T. H. . . . . Red Bank, N. J.  
 Green, B. R. . . . . Washington, D. C.  
 Greene, F. S. . . . . New York City  
 Greene, J. N. . . . . Boston, Mass.  
 Gregory, C. E. . . . . New York City  
 Gregory, J. H. . . . . Paterson, N. J.  
 Grimm, C. R. . . . . New York City  
  
 Hagar, E. M. . . . . Chicago, Ill.  
 Haight, S. S. . . . . New York City  
 Hall, M. W. . . . . New York City  
 Hammatt, W. C. . . . Mexico, Mexico  
 Hammer, R. H. . . . . New York City  
 Harlow, J. H. . . . . Pittsburg, Pa.  
 Harper, A. C. . . . . New York City  
 Harrington, J. L. . . . New York City  
 Harris, C. M. . . . . New York City  
 Harrison, E. W.,  
     Jersey City, N. J.  
 Harwi, S. J. . . . . Bayonne, N. J.  
 Harwood, G. A. . . . . Syracuse, N. Y.  
 Hatt, W. K. . . . . Washington, D. C.  
 Hatton, T. C. . . . . Wilmington, Del.  
 Hauck, W. . . . . New York City  
  
 Haviland, A. . . . . New York City  
 Hayes, E. . . . . Cohoes, N. Y.  
 Hayes, S. W. . . . . Geneva, N. Y.  
 Hazelton, C. W.,  
     Turner's Falls, Mass.  
 Hazen, A. . . . . New York City  
 Hemming, D. W. . . . . New York City  
 Hendrick, C. W. . . . . New York City  
 Herbert, H. M.,  
     Bound Brook, N. J.  
 Hering, R. . . . . New York City  
 Herschel, C. . . . . New York City  
 Hickok, H. A. . . . . Newark, N. J.  
 Hill, G. . . . . New York City  
 Hoag, S. W., Jr. . . . . New York City  
 Hodgdon, F. W. . . . . Boston, Mass.  
 Hoffman, N. B. K. . . . New York City  
 Holliday, A. R. . . . . Newcastle, Pa.  
 Hone, F. de P. . . . . New York City  
 How, R. W. . . . . New York City  
 Howe, E. W. . . . . Boston, Mass.  
 Hudson, C. W. . . . . Phoenixville, Pa.  
 Humphrey, R. L.,  
     Philadelphia, Pa.  
 Hunt, Charles Warren,  
     New York City  
 Hutchings, W. E.,  
     Louisville, Ky.  
  
 Irving, W. E. . . . . New York City  
  
 Jacoby, H. S. . . . . Ithaca, N. Y.  
 Jackson, W. . . . . Boston, Mass.  
 Jaques, W. H. . . . . Boston, Mass.  
 Jarrett, E. S. . . . . New York City  
 Johnson, A. . . . . New York City  
 Johnson, A. L. . . . . St. Louis, Mo.  
 Johnson, L. J. . . . . Cambridge, Mass.  
 Johnson, W. S. . . . . Boston, Mass.  
 Just, G. A. . . . . New York City  
  
 Kaufman, G. . . . . Brooklyn, N. Y.  
 Kelly, C. W. . . . . New Haven, Conn.  
 Kelly, O. M. . . . . New York City  
 Kenney, E. F. . . . . Philadelphia, Pa.

- Khuen, R. J. . . . .Pittsburg, Pa.  
 Kimball, G. A. . . . .Boston, Mass.  
 King, P. S. . . . .New York City  
 King, W., Jr. . . . .New York City  
 Knap, E. D. . . . .New York City  
 Knap, J. M. . . . .New York City  
 Knapp, L. H. . . . .Buffalo, N. Y.  
 Knight, F. B. . . . .New York City  
 Knowles, M. . . . .Pittsburg, Pa.  
  
 La Chicotte, H. A. .New York City  
 Lamb, R. . . . .New York City  
 Landreth, W. B. . . .Albany, N. Y.  
 Latta, H. W. . . . .Philadelphia, Pa.  
 Lederle, G. A. . . . .Chicago, Ill.  
 Lee, D. R. . . . .Middletown, N. Y.  
 Lee, W. B. . . . .Hillburn, N. Y.  
 Leffingwell, F. D. .Harrisburg, Pa.  
 Leisen, T. A. . . .Wilmington, Del.  
 Leonard, H. R. . . .Philadelphia, Pa.  
 Lesley, R. W. . . .Philadelphia, Pa.  
 Lewis, F. H. . . . .Craigsville, Va.  
 Lewis, M. H. . . . .New York City  
 Lewis, N. P. . . . .New York City  
 Lindenthal, G. . . .New York City  
 Lofland, H. F. . . .Pencoyd, Pa.  
 Loomis, H. . . . .New York City  
 Low, G. E. . . . .New York City  
 Lowinson, O. . . . .New York City  
 Ludwig, J. A. . . . .New York City  
 Lund, G. A. . . . .Bridgeport, Conn.  
 Lundie, J. . . . .New York City  
 Luster, W. H., Jr. .Elizabeth, N. J.  
  
 Macdonald, A. A. .New York City  
 Macdonald, C. . . .New York City  
 MacGregor, R. A. .New York City  
 Machen, H. B. . . .New York City  
 Maclay, W. W. . . .New York City  
 McComb, C. O. . .Watertown, N. Y.  
 McDonald, H. P., Jr.,  
     Jersey City, N. J.  
 McHarg, L. . . . .New York City  
 McKenzie, T. H.,  
     Southington, Conn.  
  
 McMinn, T. J. . . .New York City  
 McNicol, J. A. . . .New York City  
 McNulty, G. W. . .New York City  
 Malukoff, A. J. . . .New York City  
 Manley, H. . . . .Boston, Mass.  
 Marden, H. H., Jr. .New York City  
 Marple, W. M. . . .Scranton, Pa.  
 Martin, C. C. . . . .Brooklyn, N. Y.  
 Martin, W. . . . .New York City  
 Mason, F. . . . .New York City  
 Mead, C. A.,  
     Upper Montclair, N. J.  
 Mead, E. . . . .Washington, D. C.  
 Meem, J. C. . . . .New York City  
 Merriman, M. . . .Bethlehem, Pa.  
 Merriman, T. . . . .New York City  
 Merryman, W. C. .New York City  
 Metcalf, L. . . . .Boston, Mass.  
 Miller, H. A. . . . .Clinton, Mass.  
 Miller, H. C. . . . .New York City  
 Miller, R. P. . . . .New York City  
 Moisseiff, L. S. . . .New York City  
 Moore, C. H. . . . .New York City  
 Moore, W. H. . . .New Haven, Conn.  
 Morse, C. A. . . . .La Junta, Colo.  
 Moulton, M. . . . .Springfield, Mass.  
 Myers, C. H. . . . .New York City  
 Myers, J. H. . . . .New York City  
  
 Neumeyer, R. E. . .Bethlehem, Pa.  
 Nichols, C. H. . . .New Haven, Conn.  
 Nichols, O. F. . . .Brooklyn, N. Y.  
 Noble, A. . . . .New York City  
 North, E. P. . . . .New York City  
  
 O'Brien, J. H. . . .New York City  
 Ockerson, J. A. . . .St. Louis, Mo.  
 Odell, F. S. . . . .Port Chester, N. Y.  
 Olney, L. F. . . . .New York City  
 O'Rourke, J. F. . . .New York City  
 Orr, A. . . . .Gloversville, N. Y.  
 Osborn, F. C. . . .Cleveland, Ohio  
 Owen, J. . . . .Newark, N. J.  
 Oxholm, T. S.,  
     West New Brighton, N. Y.

- Parker, A. McC...New York City  
 Parker, C. J.....Rutland, Vt.  
 Parsons, W. B....New York City  
 Pegram, G. H....New York City  
 Pitts, T. D.....New York City  
 Plimpton, A. L....Boston, Mass.  
 Pollock, C. D....Brooklyn, N. Y.  
 Potter, H. W.....New York City  
 Pratt, W. A.....New York City  
 Pratt, W. A....Philadelphia, Pa.  
 Price, P. W.....Pittsburg, Pa.  
 Prout, H. G.....New York City  
  
 Quimby, H. H...Philadelphia, Pa.  
  
 Rafter, G. W....Rochester, N. Y.  
 Ramsey, E. P....New York City  
 Raymond, W. G....Troy, N. Y.  
 Reed, D. A.....Duluth, Minn.  
 Reed, W. B.....New York City  
 Reid, H. A.....Brooklyn, N. Y.  
 Reynders, J. V. W.,  
                                   Harrisburg, Pa.  
 Rice, G. S.....New York City  
 Richardson, C....New York City  
 Richardson, C. L. Montclair, N. J.  
 Ricketts, P. C.....Troy, N. Y.  
 Ridgway, R.....New York City  
 Riedel, A. E....Montclair, N. J.  
 Rogge, J. C. L....New York City  
 Rosenberg, F....Montclair, N. J.  
 Russell, R. L....Brooklyn, N. Y.  
 Ryan, M. H.....New York City  
  
 Scarborough, F. W.,  
                                   Richmond, Va.  
 Schmitz, F. C....New York City  
 Schneider, C. C. Philadelphia, Pa.  
 Sherrerd, M. R....Newark, N. J.  
 Shryock, J. G...Philadelphia, Pa.  
 Simpson, G.....New York City  
 Simpson, G. F....New York City  
 Sinclair, F. O....Burlington, Vt.  
 Skinner, F. W....New York City  
 Smith, A.....New York City  
 Smith, C. W.....New York City  
 Smith, J. W.....New York City  
 Smith, W. F.....New York City  
 Snow, J. P.....Boston, Mass.  
 Soosmith, C....New York City  
 Spencer, W. T. New Haven, Conn.  
 Sperry, H. M....New York City  
 Spooner, A. N....New York City  
 Stearns, F. L....New York City  
 Stearns, F. P....Boston, Mass.  
 Steffens, W. F....New York City  
 Stern, E. W.....New York City  
 Stevens, A.....New York City  
 Stewart, J. H....New York City  
 Stewart, J. M....New York City  
 Stoddard, G. C...New York City  
 Strachan, J.....Brooklyn, N. Y.  
 Strawn, T. C.....Newark, N. J.  
 Strobel, C. L.....Chicago, Ill.  
 Swain, G. F.....Boston, Mass.  
 Swensson, E....Pittsburg, Mass.  
 Swinburne, G. W. New York City  
 Swindells, J. S..Mt. Kisco, N. Y.  
  
 Tainter, F. S.....Far Hills, N. J.  
 Taylor, C. F....East Boston, Mass.  
 Taylor, L. A.....Boston, Mass.  
 Temple, J. C....Philadelphia, Pa.  
 Temple, W. H. G. Providence, R. I.  
 Tenney, G. O. Spartanburg, S. C.  
 Thackray, G. E....Johnstown, Pa.  
 Thomas, G. E....New York City  
 Thomes, E. H....New York City  
 Thomson, G. H....New York City  
 Thomson, T. K...New York City  
 Thornley, J.....New York City  
 Tibbals, G. A....Brooklyn, N. Y.  
 Tibbals, S. G....Brooklyn, N. Y.  
 Tighe, J. L.....Holyoke, Mass.  
 Tilden, C. J.....New York City  
 Tingley, R. H...Providence, R. I.  
 Travell, W. B.  
                                   West New Brighton, N. Y.  
 Tribus, L. L.....New York City  
 Triest, W. G. F...New York City

Trotter, A. W. . . . .	New York City	Webster, G. S. . . . .	Philadelphia, Pa.
Trout, C. E. . . . .	New York City	Webster, W. R. . . . .	Philadelphia, Pa.
Tucker, L. W. . . . .	Albany, N. Y.	Weiskopf, S. C. . . . .	New York City
Turner, D. L. . . . .	New York City	Weston, R. S. . . . .	Boston, Mass.
Turner, E. K. . . . .	Boston, Mass.	Wheeler, H. R. . . . .	New York City
Turrill, S. M. . . . .	Syracuse, N. Y.	Wheeler, R. N. . . . .	New York City
Tuttle, A. S. . . . .	New York City	Whiskeman, J. P. . . . .	New York City
Ulrich, D. . . . .	New York City	White, L. . . . .	New York City
Upham, R. D. . . . .	New York City	White, T. S. . . . .	Beaver Falls, Pa.
Value, B. R. . . . .	New York City	White, W. U. . . . .	Philadelphia, Pa.
Van Horne, J. G. . . . .	New York City	Whitson, A. M. . . . .	New York City
Vier, H. . . . .	New York City	Wiggin, E. W. . . . .	New Haven, Conn.
Vogleson, J. A. . . . .	Philadelphia, Pa.	Wiggin, T. H. . . . .	Boston, Mass.
Vredenburg, W., Jr. . . . .	New York City	Wiggins, W. D. . . . .	Toledo, Ohio
Vrooman, M. . . . .	Gloversville, N. Y.	Wilcock, F. . . . .	New York City
Wadsworth, J. E. . . . .	New York City	Wilgus, W. J. . . . .	New York City
Wagner, S. T. . . . .	Philadelphia, Pa.	Wilkes, J. K. . . . .	New Rochelle, N. Y.
Ward, C. D. . . . .	New York City	Williams, G. S. . . . .	Ithaca, N. Y.
Ward, C. R. . . . .	New York City	Williams, R. B., Jr., . . . . .	New York City
Ware, R. W. . . . .	Plainfield, N. J.	Williamson, F. S. . . . .	New York City
Washington, W. de H., . . . . .	New York City	Wilson, C. W. S., . . . . .	New Rochelle, N. Y.
Watkins, F. W. . . . .	New York City	Wölfel, P. L. . . . .	Philadelphia, Pa.
Webster, A. L. . . . .	New York City	Wright, J. B. . . . .	New York City
		Zook, M. A. . . . .	Plainfield, N. J.

## ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

### MEETINGS.

**Wednesday, March 4th, 1903.** 8.30 P. M. —A regular business meeting will be held. Ballots for membership and ballots on the proposed amendment to the Constitution will be canvassed, and a paper by M. H. Gerry, Jr., Assoc. M. Am. Soc. C. E., entitled "A High-Voltage Power Transmission," will be presented for discussion. This paper was printed in *Proceedings* for January, 1903.

**Wednesday, March 18th, 1903.** 8.30 P. M. —At this meeting a paper by George W. Lilly, Assoc. M. Am. Soc. C. E., entitled "Sand-Blast Cleaning of Structural Steel," will be presented for discussion. This paper is printed in this number of *Proceedings*.

**Wednesday, April 1st, 1903.**—8.30 P. M. A regular business meeting will be held. Ballots for membership will be canvassed, and two papers will be presented for discussion, as follows: "The Filtration Works of the East Jersey Water Company, at Little Falls, New Jersey," by George W. Fuller, Assoc. M. Am. Soc. C. E.; and "Automatic Modules for Regulating the Speed of Filtration," by Charles Anthony, Jr., M. Am. Soc. C. E. These papers are printed in this number of *Proceedings*.

### ADDITIONAL PAPER.

Attention is called to the paper entitled "Note on the Coefficient of Elasticity of Concrete and Mortar Beams During Flexure," by Myron S. Falk, Jun. Am. Soc. C. E., published in this number of *Proceedings*. This paper will not be presented for discussion at any meeting, but written communications on the subject are invited for publication, and its discussion may be called up by any member at any future meeting of the Society.

### ANNUAL CONVENTION OF 1903.

The Thirty-fifth Annual Convention of the Society will be held at Asheville, N. C., during the week beginning June 8th, 1903.



## ACCESSIONS TO THE LIBRARY.

From January 14th to February 10th, 1903.

## DONATIONS.\*

**FOWLER'S ELECTRICAL ENGINEER'S YEAR-BOOK AND DIRECTORY OF LIGHT, POWER AND TRACTION STATIONS, 1903.**

Leather, 6 x 4 ins., 479 pp., illus. Scientific Publishing Company, Manchester. 2 shillings 6 pence, net. Post free, 2 shillings 9 pence.

The preface states that in this book the work of revision has been extensive. Much new matter has been inserted, and among the additions are practical notes on the designing and testing of dynamos and motors. Some information is also given on rotary converters and switch-boards, electric welding, etc. A little pruning has been done to afford space for the fifty or sixty pages of new matter which has been added and the extensions in other directions which were desirable. In an appendix is given a directory of electric light and power stations throughout the United Kingdom, which furnishes the principal particulars of the pressures and methods of distribution as well as of boilers, engines, and electrical equipment, of between 400 and 500 stations. There is an index of nineteen pages.

**AMERICAN ENGINEERING PRACTICE.**

In the Construction of Rotary Portland Cement Plants, Designed and Erected by Lathbury and Spackman, Philadelphia, Pa. Cloth, 9 x 11 ins., 157 pp., illus. G. M. S. Armstrong, Philadelphia, 1902. \$2.00. (Donated by *Cement and Engineering News*.)

In the Announcement the authors state that they offer to those interested, photographic and other illustrations of some of the plants that they have designed and constructed, and of the machinery they contain, all of which they have installed.

**MANUAL FOR RESIDENT ENGINEERS.**

Containing General Information on Construction. By F. A. Molytor and E. J. Beard. Cloth, 7 x 4½ ins., 4 + 118 pp., 13 tables. New York, John Wiley & Sons, 1903. \$1.00.

During the construction of the Choctaw, Oklahoma and Gulf Railroad Company's line across the State of Arkansas in 1899, the first fifty pages of this book were written by the authors and published in blue-print form as "Instructions" to their resident engineers, with a view of obtaining uniformity of method in both work and results. When the company, in 1901, entered upon some 500 miles of extensions and branches separated from one another, making personal supervision difficult and slow, the authors revised the body of the book, and also the standard specifications of the company, which, together with the tables of level cuttings, were added to the original instructions and published in book form for the railroad company's use. After three years of private circulation, the authors have decided to present the "Manual" to the profession generally, and to the younger members particularly, with the hope that it may be as successful in standardizing and simplifying the work of resident engineers throughout the country as it has been in the instance of one railroad. There is an index of five pages.

**CATECHISM OF THE LOCOMOTIVE.**

By Matthias N. Forney. Second Edition, Revised and Enlarged. Cloth, 8 x 6 ins., 16 + 709 pp., illus. *The Railroad Gazette*, New York, 1897. \$3.50.

Since the first edition of this work, in 1873, many changes and improvements have been made in the construction of locomotives, so that in preparing a second edition of the book the first one had to be thoroughly revised, and, to a great extent, rewritten. Also a great deal of entirely new matter had to be added to bring it up to the present state of the art of locomotive engineering. Most of the illustrations are entirely new, and have been selected from the latest practice in this country. The chapter headings are: Force and Motion; Resolution of Motion and Forces; The Principles of the Lever; The Forces of Air and Steam; On Work, Energy and the Mechanical Equivalent of Heat; The Steam Engine; The Expansive Action of Steam; The Slide-Valve; The Action of the Piston, Connecting Rod and Crank; General Description of a Locomotive Engine; Different Kinds of Locomotives; Locomotive Boilers; The Boiler Attachments; The

\* Unless otherwise specified, books in this list have been donated to the Library by the Publisher.

Throttle Valve and Steam Pipes; The Cylinders, Pistons, Guide-Bars, Cross-Heads and Connecting-Rods; The Valve-Gear; Action of the Pistons, Cranks and Driving-Wheels; Adhesions and Traction; Internal Disturbing Forces in the Locomotive; The Running Gear; Miscellaneous; Friction and Lubrication; Screw-Threads, Bolts and Nuts; Tenders; Water Tanks and Turn-Tables; The Westinghouse Air-Brake; The Care and Use of the Air Brake; The James Vacuum Driving-Wheel Brake; Proportions of Locomotives; Combustion; The Resistance of Trains; Performance and Cost of Operating Locomotives; The Care and Inspection of Locomotives while in the Engine House; Running Locomotives; Responsibilities and Qualifications of Locomotive Engineers; Accidents to Locomotives; Accidents and Injuries to Persons; Properties of Steam; Hyperbolic Logarithms. There is an index of twenty-nine pages.

#### PROCÉDÉS GÉNÉRAUX DE CONSTRUCTION TRAVAUX D'ART.

Par A. de Préaudeau, avec la collaboration de E. Pontzen. Tome Second.: Construction des Ouvrages. Paper, 10 x 6 ins., 3 + 612 pp., illus., Paris, Ch. Béranger, 1903. 20 fr. (Donated by Ernest Pontzen.)

The Contents are: Fondations à l'air libre, à sec et sous l'eau; Procédés de consolidation du sous-sol, accidents; Fondations à l'aide de l'air comprimé; Entretien et réparation des ouvrages, démolitions; Travaux en élévation; Prix de revient (fondations, travaux en élévation).

#### ENGINEERING FOR LAND DRAINAGE.

A Manual for Laying Out and Constructing Drains for the Improvement of Agricultural Lands. By Charles G. Elliott, M. Am. Soc. C. E. Cloth, 7½ x 5 ins., 8 + 232 pp., illus. New York, John Wiley & Sons, 1903. \$1.50.

The preface states that this brief treatise on drainage engineering is intended for the use of those who are charged with the responsibility of making plans for and executing drainage improvements. It puts the experience and practice of years into a form which will be available to others who wish to acquire quickly the principles and practice of land drainage. It has been the purpose of the author to emphasize and make clear those points which the student, the busy agriculturist, and the practical engineer should know. The chapter headings are: Introduction; Soils; Land Drainage Practice; Levelling and Topography; Laying out Drains in the Field; Fixing the Grade of Drains; Maps and Records; Grading the Ditches for Tile; Flow of Water through Pipes; Size of Lateral Drains; Open Drains; Drainage of Barnyards, Cattle-Lanes, etc.; Road Drainage; Drainage Districts; Estimates of Cost; Benefits and Profits of Land Drainage. There is an index of ten pages.

#### STEAM POWER PLANTS, THEIR DESIGN AND CONSTRUCTION.

By Henry C. Meyer, Jr. Cloth, 9 x 6 ins., 159 pp., illus. New York, McGraw Publishing Co., 1903. \$2.00.

The publishers' note states that the matter in this book was written to give information to owners or managers of manufacturing plants or buildings requiring power installations, since they are from time to time called upon to specify or purchase the machinery needed for the proper equipment of their buildings with a view to efficiency and economy in operation. It is believed that the book will also prove valuable to the engineer, architect or student who desires general information on the subject treated. To the expert it claims only to present in accessible and convenient form data useful in the practice of his profession. The Contents are: Design of Steam Power Plants; Proportioning Steam Boilers; Design of Tubular Boilers and Boiler Specifications; Selection of Engines; Specifications for Steam Engines; Steam and Water Piping; Condensers; Feed Water Heaters and Economizers; Mechanical Draft; Chimneys; Coal Handling, Water Supply and Purification.

#### THE MANUFACTURE AND PROPERTIES OF IRON AND STEEL.

By Harry Huse Campbell, M. Am. Inst. Min. E., M. Am. Soc. C. E., M. Iron and Steel Inst. Second Edition. Cloth, 9 x 6 ins., 29 + 862 pp., illus. New York, *The Engineering and Mining Journal*, 1903. \$5.00. (Donated by the Author.)

In this present edition the author has tried to give in Part I a kind of introduction for those who are not metallurgists. It does not pretend to give all the qualifying conditions, but simply the main principles. Part II embraces the ground covered by the first edition of *Structural Steel*, but many chapters have been entirely rewritten, and a great deal of new matter added. Much of the text relating to the chemical history of the open-hearth furnace has been condensed from certain papers which the author contributed to the *Transactions of the American Institute of Mining Engineers*, while portions of chapters appeared in the *Transactions of the American Society of Civil Engineers*. The experiments and investigations have been conducted at the works of

The Pennsylvania Steel Company, of Steelton, Pa., and all the details of manufacture and treatment have been under the author's direct observation. In Part III the author has entered into a more comprehensive comparison of the industrial situation, and has compared the salient points of foreign and American practice. The Contents are: The Main Principles of Iron Metallurgy; The Errancy of Scientific Records; The Blast Furnace; Wrought-Iron; Steel; High-Carbon Steel; The Acid-Bessemer Process; The Basic-Bessemer Process; The Open-Hearth Furnace; Fuel; The Acid Open-Hearth Process; The Basic Open-Hearth Process; Special Methods of Manufacture and Some Items Affecting the Costs; Segregation and Homogeneity; Influence of Hot Working on Steel; Heat Treatment; The History and Shape of the Test-Piece; The Influence of Certain Elements on the Physical Properties of Steel; Classification of Structural Steel; Welding; Steel Castings; The Iron Industry of the Leading Nations. There is an index of twenty-two pages.

Gifts have also been received from the following:

Am. Inst. of Min. Engrs. 16 pam.	New South Wales—Ry. Commrs. 1 bound vol.
Ariz. Agri. Exper. Station. 1 pam.	<i>New York World.</i> 1 vol.
Arnold, Bion J. 2 vol.	Nichols, Charles H. 2 bound vol.
Australasian Inst. of Min. Engrs. 2 pam.	Pharr, H. N. 3 pam.
Boston, Mass.—Pub. Lib. 1 pam.	Ross, D. W. 1 pam.
Boston, Mass.—Transit Comm. 1 bound vol.	Snow, C. H. 1 bound vol.
Buffalo, N. Y.—Deputy Water Commr. 1 vol.	South Eastern Ry. Co. 2 pam.
Cambridge, Mass.—Water Board. 1 pam.	Southern Indiana Ry. Co. 1 pam.
Canadian Inst. 1 vol.	Sweet, Elnathan. 1 pam.
Conn.—R. R. Commrs. 1 bound vol.	Swenson, Emil. 1 pam.
Damascus Steel Co. 1 pam.	Switzerland—Eiden. hydrometrisches Bureau. 1 pam.
Deutsch-Amerikanischer Techniker-Verband. 1 pam.	Thurston, E. H. 1 pam.
Ellis, G. E. 1 bound vol.	Tutein-Nolthenius, R. P. J. 1 pam.
Fisher, E. A. 1 vol.	U. S. Bureau of Foreign Commerce. 2 pam.
Ford, Frederick L. 1 pam.	U. S. Chief of Engrs. 2 bound vol.
Great Britain—Patent Office. 6 pam.	U. S. Coast and Geodetic Surv. 1 bound vol.
Iowa Eng. Soc. 6 pam.	U. S. Geological Surv. 2 bound vol., 22 pam.
Iron and Steel Inst. 1 bound vol.	U. S. Weather Bureau. 1 bound vol.
Macmillan Co. 1 bound vol.	Univ. of Ill. 1 pam.
McMinn, T. J. 1 pam.	Univ. of Ill. Agri. Exper. Station. 1 pam.
Mass.—Harbor and Land Commrs. 1 bound vol.	Univ. of Texas Mineral Surv. 1 pam.
Miles, John W. 1 pam.	Weir Frog Co. 1 bound vol.
New England Cotton Mfrs. Assoc. 1 bound vol.	Unknown Donors. 2 pam.

### BY PURCHASE.

**Rivières Canalisées.** Par F. B. de Mas. Paris, Ch. Beranger, 1903.

**The Analysis of Steel-Works Materials.** By Harry Brearley and Fred Ibbotson. Longmans, Green and Co., London, New York and Bombay, 1902.

**United States Official Postal Guide, January, 1903.** Revised and Published Monthly by Authority of the Post Office Department. Contains an Alphabetical List of All the Post Offices in the United States with County and State, a List by States, a List by States and Counties, Showing the Money-Order Offices, Domestic and International; also, Rates of Postage; Synopsis of Postal Laws, Orders, Rulings of the Department; Information Relating to Postal Matters; and General Regulations Respecting Foreign Mails. Philadelphia, George F. Lasher.

### SUMMARY OF ACCESSIONS.

From January 14th to February 10th, 1903.

Donations (including 10 duplicates).....	111
By Purchase .....	3
Total.....	114

## MEMBERSHIP.

## ADDITIONS.

MEMBERS.		Date of Membership.	
ALLAN, PERCY	Public Works Dept., Sydney, N. S. W., Aus- ) Assoc. M.	April	1, 1896
	India ) M.	Oct.	1, 1902
BARNARD, EDWARD CHESTER	Topographer, U. S. Geological Survey, Washington, D. C.	Dec.	3, 1902
BYER, ARTHUR JAMES	Engr. in chg., Great Falls Power Co., Nash- ) Assoc. M.	Mar.	6, 1901
	ville, Tenn. ) M.	Feb.	4, 1903
FITCH, GRAHAM DENBY	Capt., Corps of Engrs., U. S. A., U. S. Engr. Office, Little Rock, Ark.	Feb.	4, 1903
SHERMAN, CHARLES WINNLOW	Div. Engr., Sudbury Dept., Met. Water-Works, } Jun.	Oct.	8, 1891
	1 Ashburton Pl., Boston, Mass. ) Assoc. M.	May	2, 1900
		Feb.	4, 1903
THOMPSON, HENRY CLARK	Div. Engr., N. Y. C. & H. R. R. R., 42 Lorillard Pl., Fordham, New York City	Feb.	4, 1903
WISNER, GEORGE MONROE	Asst. Chf. Engr., San. Dist. of Chicago, 1010 Security Bldg., Chicago, Ill.	Feb.	4, 1903
ASSOCIATE MEMBERS.			
ASHBAUGH, LEWIS EUGENE	Asst. Prof. of Civ. Eng., Iowa State Coll., Ames, Iowa	Jan.	7, 1903
AURYANSEN, FREDERICK	Chf. Draftsman, Atlantic Ave. Impvt., L. I. R. } Jun.	Oct.	5, 1897
	R., 44 Court St., Brooklyn, N. Y. ) Assoc. M.	Dec.	3, 1902
BACON, GEORGE MORGAN	624 Dooly Bk., Salt Lake City, Utah	Dec.	3, 1902
BANTEL, EDWARD CHRISTIAN HENRY	Instr. in Civ. Eng., Univ. of Texas, 2600 Whitis Ave., Austin, Tex.	Feb.	4, 1903
BRADSHAW, SAM WIGFALL	Asst. Engr., Estimating Dept., Pennsylvania } Jun.	Oct.	2, 1900
	Steel Co., Steelton, Pa. ) Assoc. M.	Feb.	4, 1903
DANA, RICHARD TURNER	Railroad Location and Gen. Engr., Room 206, } Jun.	Sept.	11, 1900
	Bennett Bldg., New York City ) Assoc. M.	Feb.	4, 1903
DAY, EDWARD BLISS	Office Engr., Burlington's Missouri Lines, Room 610, Globe Democrat Bldg., St. Louis, Mo.	Feb.	4, 1903
FERGUSON, WILLIAM HASTINGS	(Best & Ferguson, Cons. Engrs.), 16 Ferguson Bldg., Denver, Colo.	Jan.	7, 1903



		Date of Membership.
HALL, CHARLES ROMNEY		
U. S. Eng. Dept., Fort McKinley, Portland Harbor, Me..	Jan.	7, 1903
JAUDON, HENRY SCUDDER		
Care, Birmingham Water-Works Co., Birmingham, Ala...	Feb.	4, 1903
McKAY, GEORGE ALBERT		
Civ. Engr., U. S. N., Narragansett Bay Coal Depot, New-		
port, R. I. ....	Feb.	4, 1903
ROCKWELL, JAMES VINCENT		
Asst. Engr., C. & N. W. Ry., Eagle Grove, {	Jun.	April 3, 1900
Iowa. ....	Assoc. M.	Feb. 4, 1903
SHEPARDSON, JOHN EATON		
Shabbona Grove, De Kalb Co., Ill. ....	Jan.	7, 1903
TOMPKINS, EDWARD DE VOE		
Chf. Draftsman, Bureau of Yards and Docks,		
U. S. Navy Yard, League Island, Philadel- {	Jun.	Feb. 2, 1897
phia, Pa. ....	Assoc. M.	Dec. 3, 1902
WHEELER, RALPH NORMAN		
With Rapid Transit R. R. Comm., 13 Astor Pl., New		
York City. ....	Jan.	7, 1903
WHITE, LAZARUS		
18 West 119th St., New York City. ....	Jun.	May 1, 1900
	Assoc. M.	Feb. 4, 1903

## ASSOCIATES.

KELLER, OTTO BALTHAZAR		
127 Fulton St., New York City .....	Feb.	3, 1903
QUIRK, EUGENE McGRATH		
Mgr., Montreal Quarry Co., 266 Boulevard, Ville St.		
Louis, Montreal, Que., Canada. ....	Feb.	3, 1903

## JUNIORS.

BASSETT, ROBERT JAY		
25 North 4th St., Steelton, Pa. ....	Feb.	3, 1903
DOUGHERTY, RICHARD ERWIN		
244 West 20th St., New York City .....	Jan.	6, 1903
FUJINO, SHUKICHI		
Bridge Engr., Nippon Tetsudo Kwaisha, Tokyo, Japan...	Feb.	3, 1903
GEORGE, HUGH MELVIN		
Care, Water Co., Meridian, Miss. ....	Feb.	3, 1903
KOLB, HENRY JACOB		
Care, Dr. Dillworth, Bedford Park, New York City. ....	Feb.	3, 1903
PEARSE, LANGDON		
317 Walnut Ave., Roxbury, Mass. ....	Jan.	6, 1903
TOMBO, CARL		
273 West 138th St., New York City. ....	Feb.	3, 1903
WILDES, WALDO GILMAN		
208 Church St., Clinton, Mass. ....	Feb.	3, 1903



RESIGNATIONS.

MEMBERS.

	Date of Resignation.
SEE, HORACE . . . . .	Dec. 31, 1902
WATSON, CHARLES WALLACE . . . . .	Dec. 31, 1902

DEATHS.

BARRIGER, JOHN WALKER, JR. . . . .	Elected Junior, May 31st, 1898; Associate Member April 2d, 1902; died December 19th, 1902.
FUERTES, ESTEVAN ANTONIO . . . . .	Elected Member February 17th, 1869; died January 16th, 1903.
RICH, WATSON WELLMAN . . . . .	Elected Member September 5th, 1883; died January 12th, 1903.
SWEET, ELNATHAN . . . . .	Elected Member November 6th, 1878; died January 27th, 1903.

## MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(January 14th to February 10th, 1903.)

NOTE.—*This list is published for the purpose of placing before the members of the Society the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

### LIST OF PUBLICATIONS.

*In the subjoined list of articles references are given by the number prefixed to each journal in this list.*

- |   |  |
|---|--|
| (1) <i>Journal, Assoc. Eng. Soc.</i> , 257 South Fourth St., Philadelphia, Pa., 30c.              | (32) <i>Mémoires et Compte Rendu des Travaux</i> , Soc. Ing. Civ. de France, Paris, France.  |
| (2) <i>Proceedings, Eng. Club of Phila.</i> , 1122 Girard St., Philadelphia, Pa.                  | (33) <i>Le Génie Civil</i> , Paris, France.  |
| (3) <i>Journal, Franklin Inst.</i> , Philadelphia, Pa., 50c.                                      | (34) <i>Portefeuille Economique des Machines</i> , Paris, France.                            |
| (4) <i>Journal, Western Soc. of Engrs.</i> , Monadnock Block, Chicago, Ill.                       | (35) <i>Nouvelles Annales de la Construction</i> , Paris, France.                            |
| (5) <i>Transactions, Can. Soc. C. E.</i> , Montreal, Que., Canada.                                | (36) <i>La Revue Technique</i> , Paris, France.  |
| (6) <i>School of Mines Quarterly</i> , Columbia Univ., New York City, 50c.                        | (37) <i>Revue de Mécanique</i> , Paris, France.  |
| (7) <i>Technology Quarterly</i> , Mass. Inst. Tech., Boston, Mass., 75c.                          | (38) <i>Revue Générale des Chemins de Fer et des Tramways</i> , Paris, France.               |
| (8) <i>Stevens Institute Indicator</i> , Stevens Inst., Hoboken, N. J., 50c.                      | (39) <i>Railway Master Mechanic</i> , Chicago, Ill., 10c.                                    |
| (9) <i>Engineering Magazine</i> , New York City, 25c.   | (40) <i>Railway Age</i> , Chicago, Ill., 10c.  |
| (10) <i>Cassier's Magazine</i> , New York City, 25c.  | (41) <i>Modern Machinery</i> , Chicago, Ill., 10c.   |
| (11) <i>Engineering</i> (London), W. H. Wiley, New York City, 25c.                                | (42) <i>Transactions, Am. Inst. Elec. Engrs.</i> , New York City, 50c.                       |
| (12) <i>The Engineer</i> (London), International News Co., New York City, 35c.                    | (43) <i>Annales des Ponts et Chaussées</i> , Paris, France.                                  |
| (13) <i>Engineering News</i> , New York City, 15c.  | (44) <i>Journal, Military Service Institution</i> , Governor's Island, New York Harbor, 50c. |
| (14) <i>The Engineering Record</i> , New York City, 12c.  | (45) <i>Mines and Minerals</i> , Scranton, Pa., 20c.   |
| (15) <i>Railroad Gazette</i> , New York City, 10c.  | (46) <i>Scientific American</i> , New York City, 8c.   |
| (16) <i>Engineering and Mining Journal</i> , New York City, 15c.                                  | (47) <i>Mechanical Engineer</i> , Manchester, England.                                       |
| (17) <i>Street Railway Journal</i> , New York City, 35c.  | (54) <i>Transactions, Am. Soc. C. E.</i> , New York City, \$5.                               |
| (18) <i>Railway and Engineering Review</i> , Chicago, Ill., 10c.                                  | (55) <i>Transactions, Am. Soc. M. E.</i> , New York City, \$10.                              |
| (19) <i>Scientific American Supplement</i> , New York City, 10c.                                  | (56) <i>Transactions, Am. Inst. Min. Engrs.</i> , New York City, \$5.                        |
| (20) <i>Iron Age</i> , New York City, 10c.  | (57) <i>Colliery Guardian</i> , London, England.   |
| (21) <i>Railway Engineer</i> , London, England, 25c.  | (58) <i>Proceedings, Eng. Soc. W. Pa.</i> , 410 Penn Ave., Pittsburg, Pa., 50c.              |
| (22) <i>Iron and Coal Trades Review</i> , London, England, 25c.                                   | (59) <i>Transactions, Mining Inst. of Scotland</i> , London and Newcastle-upon-Tyne.         |
| (23) <i>Bulletin, American Iron and Steel Assoc.</i> , Philadelphia, Pa.                          | (60) <i>Municipal Engineering</i> , Indianapolis, Ind., 25c.                                 |
| (24) <i>American Gas Light Journal</i> , New York City, 10c.                                      | (61) <i>Proceedings, Western Railway Club</i> , 225 Dearborn St., Chicago, Ill., 25c.        |
| (25) <i>American Engineer</i> , New York City, 20c.   | (62) <i>American Manufacturer and Iron World</i> , 59 Ninth St., Pittsburg, Pa.              |
| (26) <i>Electrical Review</i> , London, England.  | (63) <i>Minutes of Proceedings, Inst. C. E.</i> , London, England.                           |
| (27) <i>Electrical World and Engineer</i> , New York City, 10c.                                   | (64) <i>Power</i> , New York City, 20c.  |
| (28) <i>Journal, New England Water-Works Assoc.</i> , Boston, \$1.                                | (65) <i>Official Proceedings, New York Railroad Club</i> , Brooklyn, N. Y., 15c.             |
| (29) <i>Journal, Society of Arts</i> , London, England, 15c.                                      | (66) <i>Journal of Gas Lighting</i> , London, England, 15c.                                  |
| (30) <i>Annales des Travaux Publics de Belgique</i> , Brussels, Belgium.                          | (67) <i>Cement and Engineering News</i> , Chicago, Ill., 25c.                                |
| (31) <i>Annales de l'Assoc. des Ing. Sortis des Ecôles Spéciales de Gand</i> , Brussels, Belgium. | (68) <i>Mining Journal</i> , London, England.  |

## LIST OF ARTICLES.

**Bridge.**

- El Paso & Southwestern Bridge at El Paso, Texas.\* (40) Jan. 16.  
 The New Swing Span and Substructure for the Interstate Bridge, Omaha, Neb.\* (13) Jan. 22.  
 The Damage to the New East River Bridge Cables by Fire and the Proposed Method of Repairing It.\* (3) Jan. 22.  
 Pebble Faced Bridge in the National Park, Washington, D. C.\* W. J. Douglas. (13) Jan. 22.  
 Bridge across the Missouri River at East Omaha, Nebraska.\* (15) Jan. 23.  
 Erection of the Northwest Miramichi Bridge, Newcastle, N. B.\* H. D. Bush, M. Am. Soc. C. E. (15) Jan. 23.  
 The Elevation of the Chicago & Alton Bridge at Bridgeport, Chicago.\* (40) Jan. 23.  
 The Rio Grande Braced Arch Bridge, Pacific Ry. of Costa Rica.\* (18) Jan. 21.  
 The Omaha Interstate Bridge.\* (14) Jan. 21.  
 The Substructure for the 1800-Ft. Cantilever Bridge at Quebec, Canada.\* (13) Jan. 29.  
 Concrete-Steel Arch Bridges.\* Daniel B. Luten. (Paper read before the Indiana Eng. Soc.) (60) Feb.  
 Wood Block Paving and Other Features in Connection with a Small Drawbridge in Brooklyn, N. Y.\* (14) Feb. 7.  
 Le Viaduc du Vauur sur la Ligne de Carmaux à Rodez.\* (35) Jan.  
 Le Viaduc Métallique du Vauur.\* Emile Godfernaux. (38) Jan.  
 Calcul des Ponts en Maçonnerie.\* Methode de M. Ritter. (33) Jan. 3.

**Electrical.**

- Some Electrical Fire Hazards. Washington Devereux. (2) Jan.  
 Observations on the Ohmic Resistance of Electrolytes and Its Determination.\* J. Wright. (26) Jan. 2.  
 Reducing the Measured DR of a Laid Submarine Cable to 75° F. and Atmospheric Pressure. J. Rymer-Jones. (26) Jan. 2.  
 Entropy. J. Swinburne. (26) Jan. 9.  
 Electric Power Transmission in a Cube Sugar Factory.\* (26) Jan. 9.  
 A New Automatic Oil-Switch for High Tension Circuits.\* (13) Jan. 15.  
 The Hewitt Mercury Vapour Lamp and Static Converter.\* (22) Jan. 16.  
 Middlesborough Electricity Works.\* (26) Jan. 16.  
 The Electric Lighting of Erith (a Three-Phase Plant).\* (26) Jan. 16.  
 Electrically-Operated Oil Circuit-Breaker for High Tension Circuits.\* (15) Jan. 16; (27) Jan. 17; (20) Jan. 22; (18) Jan. 24.  
 Oerlikon Induction Motor with Four Speed Variations.\* Hans Behr. (27) Jan. 17.  
 Excitation of Asynchronous Generators by Means of Static Condensance. A. S. McAllister. (27) Jan. 17.  
 Cooper-Hewitt Static Converter.\* (27) Jan. 17; (17) Jan. 17.  
 The Construction of Aerial Telephone Lines.\* Arthur V. Abbott. (27) Serial beginning Jan. 17.  
 Electricity as an Underground Motive Power. Wm. Little. (Paper read to the New Seaham Mining Students' Assoc.) (62) Jan. 22.  
 The Photometry of Electric Lamps.\* J. A. Fleming. (Paper read before the Inst. of Elec. Engrs.) (11) Serial beginning Jan. 23; (Abstract of Paper read before the Inst. of Elec. Engrs.) (47) Serial beginning Jan. 17; (26) Serial beginning Jan. 2.  
 Stress on Frames of Alternating Current Generators. P. J. Frenell. (27) Jan. 24.  
 The Underground System of the Chicago Edison and Commonwealth Electric Companies. W. G. Carlton. (Abstract of Paper read before the Chicago Elec. Assoc.) (27) Jan. 24.  
 The Present State of Wireless Telegraphy.\* (10) Jan. 31.  
 26 000-Volt Installation at Grenoble, France.\* C. L. de Muralt. (27) Jan. 31.  
 Electrical Measuring Instruments.\* Caryl D. Haskins. (3) Feb.  
 Richmond, Indiana. Municipal Electric Lighting and Power Plant.\* J. B. Nelson. (Paper read before the Indiana Eng. Soc.) (60) Feb.; (Abstract of Paper read before the Indiana Eng. Soc.) (13) Jan. 29.  
 Machine Tools with Individual Electric Motors. R. T. E. Lozier. (10) Feb.  
 The Electrical Resistance of Bearings. A. E. Kennelly and C. A. Adams. (27) Feb. 7.  
 The Economic Value of Testing. Geo. D. Shepardson. (Abstract of paper read before the Northwestern Elec. Assoc.) (27) Feb. 7.  
 Structural Details of the Edison Storage Battery.\* (46) Feb. 7.  
 The Cooper Hewitt Lamp and Static Converter.\* (46) Feb. 7.  
 Bull System of Selective Wireless Telegraphy.\* (27) Feb. 7.  
 Voltage Regulation.\* (27) Feb. 7.  
 Compte Rendu du Congrès de la Houille Blanche. Ch. Pinat. (32) Nov.  
 La Nouvelle Usine Hydro-Electrique des Chutes du Niagara.\* (33) Jan. 3.

**Marine.**

- The Machinery of the Orient-Pacific Liner *Orontes*. (11) Jan. 2.  
 The Vibration of Steamships. George W. Melville. (11) Serial beginning Jan. 2.  
 Modern Marine Boilers. H. M. Rounthwaite, M. I. Mech. E. (Paper read before the Jun. Inst. Engrs.) (12) Jan. 9.  
 The S. S. *Brussels*\* (12) Jan. 9

\* Illustrated.



**Marine—(Continued).**

- The Chilean Battleship *Libertad*. (11) Jan. 16.  
 Submarine Torpedo Boats, Past, Present and Future.\* Lawrence Spear. (Abstract of paper read before the Society of Naval Architects and Marine Engineers.) (19) Feb. 7.

**Mechanical.**

- The Blast Furnace as a Power Plant.\* Edward A. Uehling. (8) Jan.  
 Kansas Natural Gas: Its Control and Distribution; Method Employed in Burning It and in Measuring the Pressures.\* W. R. Crane. (45) Jan.  
 Liquid Fuel for Electrical Stations. W. H. Booth. (26) Jan. 2.  
 Flame Analyses and Fuel Combustion.\* W. H. Booth, M. Am. Soc. C. E. (26) Jan. 2.  
 Hydraulic Machinery for an Indian Locomotive Works.\* (12) Jan. 2.  
 Sugar Making in the Hawaiian Islands; Recent Practice in the Design, Construction and Operation of Raw Cane-Sugar Factories in the Hawaiian Islands.\* J. N. S. Williams. (Paper read before the Inst. of Mech. Engrs.) (11) Serial beginning Jan. 2.  
 Comparative Economy of Stoking and Hand Firing.\* Julius Geldard. (Paper read before the Leeds Assoc. of Engrs.) (47) Jan. 3.  
 Steam Pipe Covering Tests.\* (47) Jan. 3.  
 The Use of Blast-Furnace Gas in Gas Engines. Cecil A. Cochrane. (Abstract of Paper read before the Cleveland Inst. of Engrs.) (47) Serial beginning Jan. 3.  
 An Inclined Retort-House and Its Working at Bristol.\* (66) Jan. 6.  
 The Granton Works of the Edinburgh and Leith Gas Commissioners.\* Walter Ralph Herring, M. Inst. C. E. (66) Serial beginning Jan. 6.  
 Turbo-Blowing Engine at the Farnley Iron Works.\* (22) Jan. 9.  
 Single Rock Cutting Machine. (11) Jan. 9.  
 A Remarkable Steam Engine Test. (Tests made by Prof. J. A. Ewing.) (12) Jan. 9.  
 The Purification of Blast Furnace Gas.\* (22) Serial beginning Jan. 9.  
 Testing Indicator Springs.\* (Reprinted from *Machinery*.) (47) Jan. 10.  
 Efficiency Tests of Compressed Air Machinery.\* W. C. Popplewell, A. M. Inst. C. E. (47) Serial beginning Jan. 10.  
 An English Inclined Retort Installation in Italy. (66) Jan. 13.  
 Freaks and Fallacies in Steam Engine Design. Egbert P. Watson. (62) Jan. 15.  
 Rules for Working Loads of Wire Elevator Ropes. H. C. Newcomer. (13) Jan. 15.  
 Fundamental Differences in the Construction of Gas and Steam Engines. P. Plantinga, M. Am. Soc. M. E. (13) Jan. 15.  
 The Elimination of Hand Labor in Brick Making.\* J. Parker B. Fiske. (13) Jan. 15.  
 The Lancaster Motor Car. (11) Jan. 16.  
 The "Accessible" Water-Tube Boiler.\* (22) Jan. 16.  
 The Planimeter, Explained Simply, without Mathematics.\* W. J. Tennant. (Abstract from Paper read before the Inst. of Junior Engrs.) (12) Jan. 16.  
 The Requirements of Machine Tool Operation with Special Reference to the Motor Drive.\* Charles Day. (Abstract of Paper read before the N. Y. Elec. Soc.) (40) Jan. 16.  
 Connecting and Coupling-Rods. P. H. Parr. (12) Serial beginning Jan. 16.  
 Test of Engine with Superheated Steam. J. A. Ewing. (47) Jan. 17.  
 The New Mechanical Plant of the Mutual Life Building, New York.\* (14) Jan. 17.  
 Modern Marine Boilers. H. M. Rounthwaite. (Paper read before the Junior Inst. of Engrs.) (47) Serial beginning Jan. 17.  
 Gas Purification and Gas Purifiers.\* Pierre Plantinga. (24) Jan. 19.  
 Overhead Tramrail Systems in Shops and Foundries.\* A. W. Moyer. (Paper read before the Philadelphia Foundrymen's Association.) (20) Jan. 22.  
 The Manufacture of Open-Hearth Basic Steel. C. H. Macmillan. (Paper read before the Cleveland Inst. of Engrs.) (22) Jan. 23.  
 The Cutting Angles of Tools for Metal-Work, as Affecting Speed and Feed.\* H. F. Donaldson. (Paper read before the Inst. of Mech. Engrs.) (11) Jan. 23; (47) Serial beginning Jan. 24; (12) Serial beginning Jan. 23.  
 The Auto-Chronograph: A New Electric Timing Apparatus for Automobiles.\* (19) Jan. 24.  
 Modern Tendencies in the Utilization of Power. John Joseph Flather. (19) Serial beginning Jan. 24.  
 The Gas Industry and the Manufacture of Cyanide. (24) Jan. 26; (66) Jan. 27.  
 Fans in Gas-Works.\* R. Gordon Mackay, Assoc. M. Inst. C. E. (66) Jan. 27.  
 An Oil-Gas System for Isolated Plants.\* (13) Jan. 29.  
 Five-Ton Steam Wagon for West Africa.\* (20) Jan. 29.  
 A New Derrick or "Grasshopper" Elevator for Unloading Grain from Vessels.\* (46) Jan. 31.  
 Efficiency Test of a Nordberg Air Compressor at the Burrá Burrá Mine of the Tennessee Copper Company. J. Parke Channing. (Paper presented before the Lake Superior Min. Inst.) (16) Jan. 31.  
 Census Report on Motor-Power Appliances. Edward H. Sanborn. (64) Feb.  
 Boiler Scale and the Transmission of Heat.\* (64) Feb.  
 Koerting Gas Engine.\* (64) Feb.  
 Test of a Charon Gas Engine.\* R. Mathot. (64) Feb.  
 Progress in the Introduction of the Steam Turbine.\* J. R. Bibbins. (9) Feb.  
 Machine Tools with Individual Electric Motors. R. T. E. Lozier. (10) Feb.





**Mechanical—(Continued).**

- Power from the Interior Heat of the Earth.\* William Hallock. (10) Feb.  
 Notes on House Piping (Gas). (24) Feb. 2.  
 The Extraction of Cyanogen from Gas. (From the German of Herr Walther Field). (24) Feb. 2.  
 Coking in Bee-Hive Ovens with Reference to Yield. Charles Catlett. (24) Feb. 2.  
 A Steam Engine with a Single Rotary Valve.\* (13) Feb. 5.  
 The Evolution of the Hydraulic Elevator; High-Pressure Elevators in the Prudential Buildings, Newark, N. J.\* Chas. L. Duenkel. (13) Feb. 5.  
 The Capacity of Cast Iron Sectional Steam Boilers. J. J. Blackmore. (Paper read before the Am. Soc. of Heating and Ventilating Engrs.) (20) Feb. 5; (14) Jan. 24.  
 Friction in Machinery and Lubrication. D. B. Dixon. (62) Feb. 5.  
 The Fuel Value of the North Dakota Lignites.\* Frank A. Wilder. (16) Feb. 7.  
 Evaporated Salt Industry in Kansas.\* W. R. Crane. (16) Feb. 7.  
 Les Chaudières et les Machines à Vapeur à l'Exposition de Düsseldorf. Ch. Compère. (32) Nov.  
 Nouvelle Chaudière à Tubes d'Eau.\* (34) Jan.  
 Les Moteurs à Pétrole; Trepidation et Équilibrage.\* Reperti. (36) Jan. 10.  
 La Mécanique à l'Exposition de Düsseldorf.\* Loffet. (36) Serial beginning Jan. 10.

**Metallurgical.**

- Some New Puddling Furnaces.\* (22) Jan. 9.  
 Preventing Explosions in Blast Furnaces.\* Rudolf Berg. (62) Jan. 15.  
 Static Electricity Applied to Ore Dressing.\* W. G. Swart. (16) Jan. 24.  
 Tavenner's Method of Treating Zinc Slimes. T. Lane Carter. (16) Jan. 24.  
 Metallurgical Methods at Kalgoorlie, W. A.\* E. Barton Hack. (16) Jan. 24.  
 Lead Smelting of Zinc Gold Slimes.\* P. S. Tavenner. (Abstract of Paper read before the Chemical and Metal. Soc. of S. Africa.) (16) Jan. 31; (68) Serial beginning Jan. 17.  
 The Taylor-White Process of Treating Tool-Steel. (3) Feb.  
 The Cyanide Process in Montana.\* Matt. W. Alderson. (16) Feb. 7.  
 Emploi de l'Électricité pour le Service des Four à Coke et des Hauts Fourneaux.\* J. Bratman. (33) Jan. 3.

**Military.**

- Capped and Uncapped Projectiles.\* (12) Jan. 2.  
 Test of the New 16-Inch Gun.\* (46) Jan. 31.

**Mining.**

- Summit County Placers of Colorado; a Description of the Great Hydraulic Works now Nearing Completion near Breckenridge.\* Arthur Lakes. (45) Jan.  
 Tunnel Construction in Chicago; Method of Driving and Constructing so as Not to Disturb the Surface.\* Geo. W. Jackson. (45) Jan.  
 The Mines of Argentina; The Adaptation, by the Natives, of the Methods of Working to the Requirements and Limitations of the Country.\* R. B. Brinsmade. (45) Jan.  
 Earth Pressures in Deep Mines. (57) Jan. 2.  
 Explosives in Coal Mines: A New Order. (22) Jan. 9.  
 Sinking a Shaft by Compressed Air.\* (57) Jan. 9.  
 Various Methods of Conveying Power to the Interior of Mines. T. Lindsay Galloway. Assoc. M. Inst. C. E. (Paper read before the Glasgow Univ. Eng. Soc.) (57) Serial beginning Jan. 9.  
 The Resistance to Traction of Small Mine Cars. (13) Jan. 15.  
 Diamond Mining in Kimberley.\* (12) Serial beginning Jan. 16.  
 A Safe and Economical Substitute for Dynamite. (13) Jan. 22.  
 The Bentrop System of Air-Tight Pit Head Casings.\* (22) Jan. 23.  
 The Management of Metalliferous Mines. Albert Williams, Jr. (9) Feb.  
 Gold Mining in Wales.\* W. H. Booth. (10) Feb.  
 The Sampling and Estimation of Ore in a Mine.\* T. A. Rickard. (16) Serial beginning Feb. 7.

**Miscellaneous.**

- The Metric System. A. Sonnenschein. (29) Jan. 23.

**Municipal.**

- Fire Mains.\* John C. Trautwine, Jr. (2) Jan.  
 Philadelphia High-Pressure Fire Service.\* John E. Codman. (2) Jan.  
 Stationary Fire Pumps. George J. Jones. (46) Jan. 24.  
 Warren's Bituminous Macadam Pavement. C. A. Kenyon. (Paper read before the Indiana Eng. Soc.) (60) Feb; (Abstract of Paper read before the Indiana Eng. Soc.) (14) Jan. 31.  
 The Advantages of a Bituminous Filler For Brick Pavements. (Paper read before the Indiana Eng. Soc.) (60) Feb.

**Railroad.**

- Some Features of the Guayaquil and Quito Railway, Ecuador.\* William D. Beatty. (2) Jan.  
 Westinghouse Friction Draft Gear.\* (21) Jan.



**Railroad—(Continued).**

- Low Pressure Pneumatic Signalling at Salisbury.\* (21) Jan.; (15) Jan. 23.  
 The Rutland-Canadian Railway and Its Structures.\* John W. Burke. (13) Jan. 15.  
 Goldsboro Compound Locomotives.\* Reginald Gordon. (15) Jan. 16.  
 New Car Shops for the D. L. & W. R. R. at Scranton, Pa.\* (18) Jan. 17.  
 The New York City Terminal of the Pennsylvania Railroad. (14) Jan. 17.  
 The Hubbard Valve for Braking Empty and Loaded Cars.\* (15) Jan. 23.  
 "Decapod" Passenger Locomotive for the Great Eastern Railway. (11) Jan. 23.  
 L. R. and S. C. Railway Improvements.\* (12) Serial beginning Jan. 23.  
 Terminal Station and Freight Handling System for Interurban Electric Railways at Cincinnati, O. (13) Jan. 29.  
 Some Recent Practice in Rail Making.\* (15) Jan. 30.  
 The Westinghouse Electro-Pneumatic Train Control System. (15) Jan. 30.  
 Mikado Type Freight Locomotive, Atchison, Topeka & Santa Fe Ry.\* (18) Jan. 31.  
 New Freight Locomotive for the "Burlington"; 2-8-0 Type.\* (25) Feb.  
 The New Roundhouse at Rensselaer, New York Central & Hudson River Railroad; Heating and Lighting Systems.\* (25) Feb.  
 The Comparison of Locomotives. Lawford H. Fry. (25) Feb.  
 Railway Shops. R. H. Soule. (25) Serial beginning Feb.  
 Passenger Locomotive, Northern Pacific Railway; 4-6-2 Type.\* (25) Feb.  
 An Improved Knuckle Pin for Passenger Couplers, Michigan Central Railroad.\* (25) Feb.  
 Electric Traction Entering Steam Railway Field; Latest Developments on the Italian High-Tension Three-Phase Line.\* Frank C. Perkins. (40) Feb. 6.  
 Ten-Wheel Passenger Locomotives, Great Central Railway of England.\* (40) Feb. 6.  
 Wheel Flange and Rail Wear. H. M. Perry. (15) Feb. 6.  
 Atlantic-Type Locomotive for the Norfolk & Western.\* (15) Feb. 6.  
 Vicarino Car Lighting System in France.\* (27) Feb. 7.  
 Pocastello Shops of the Oregon Short Line.\* (18) Feb. 7.  
 Moskowitz System of Electrically Lighting Steam Railway Cars from the Axle.\* (27) Feb. 7.  
 Étude de Quelques Appareils Destinés à ne Libérer les Enclenchements qu'après l'achèvement des Mouvements. M. Cossmann and C. Cuny. (38) Jan.

**Railroad, Street.**

- The Cruveller Surface Contact System. (11) Jan. 2.  
 Fault Localizing on Tramway Systems. A. Johnston. (26) Jan. 9.  
 Bournemouth Corporation Tramways.\* (26) Serial beginning Jan. 23.  
 Results with the Third Rail in Boston.\* (27) Jan. 24.  
 The Westinghouse Electro-Pneumatic System of Train Control for the Brooklyn Elevated Railway. (10) Jan. 24.  
 An Automobile Street Car.\* W. E. Partridge. (46) Jan. 24.  
 Power Plant of the Aurora, Elgin & Chicago Railway.\* (14) Feb. 7.  
 Bournemouth, England. Slot Conduit Electric Railway.\* (27) Feb. 7.  
 Electric Road from Fayet to Chamonix.\* (17) Feb. 7.  
 Note sur Différents Types de Voitures Automotrices de Tramways Électriques.\* Gustave Lelarge. (38) Serial beginning Jan.  
 Essais de Traction Électrique à Grande Vitesse entre Berlin et Zossen.\* F. Drouin. (33) Serial beginning Jan. 10.  
 L'Exploitation des Tramways Électriques dans Quelques Grandes Villes d'Angleterre. A. Payan. (33) Serial beginning Jan. 10.

**Sanitary.**

- A Sewage Sludge Reduction Plant at Cassel, Germany.\* (13) Jan. 15.  
 The Salford Sewage Purification Experiments. (14) Jan. 24.  
 Furnace Heating in the Public Library, Ilion, N. Y. (14) Jan. 31.  
 Stream Pollution and Remedial Policy. M. O. Leighton. (Paper read before the Indiana Eng. Soc.) (60) Feb.  
 Les Ordures Ménagères à Paris. E. d'Esménard. (36) Jan. 10.  
 La Protection de la Santé Publique. Vellay. (36) Serial beginning Jan. 10.

**Structural.**

- Timber Preservation. Hermann von Schrenk. (61) Dec. 16.  
 Notes on Cement Masonry. I. N. Knapp. (Paper read before the American Gas Light Assoc.) (8) Jan.  
 Progress in the Design of Roof Structures since 1850.\* Ewing Matheson. M. Inst. C. E. (12) Jan. 9.  
 Plant of the Atlas Tack Company, Fairhaven, Mass.\* (14) Jan. 17.  
 The Manufacture and Properties of Artificial Sandstone. Samuel V. Peppel. (Abstract from the Transactions of the Amer. Ceramic Society.) (13) Jan. 22.  
 A Neglected Point in the Theory of Concrete-Steel.\* John Stephen Sewell. (13) Jan. 29.  
 The Removal of a Steel Frame Building. (13) Jan. 29.  
 Report of the American Society of Civil Engineers' Committee on Uniform Tests of Cement.\* (13) Jan. 29; (14) Jan. 31.  
 Hennebique Fireproof Construction in New York and Cleveland.\* (14) Jan. 31.





**Structural (Continued).**

- Brick Factory Chimneys.\* William Wallace Christie. (Abstract of Paper read before the New England Cotton Mfrs. Assoc.) (64) Feb.  
 Hotel Belmont.\* (14) Feb. 7.  
 Le Béton de Ciment à l'Exposition Régionale de Düsseldorf.\* Paul Christophe. (35) Serial beginning Jan.  
 Les Essais au Choc sur Barreaux Entaillés.\* Abraham. (36) Serial beginning Jan. 10.  
 Ciments Portland Artificiels de Haiphong.\* F. Schiff. (33) Jan. 21.

**Water Supply.**

- Fire Mains.\* John C. Trautwine, Jr. (2) Jan.  
 Philadelphia High-Pressure Fire Service.\* John E. Codman. (2) Jan.  
 Ozone Water Purification Works at Wiesbaden-Schierstein. (26) Jan. 2.  
 The Extension of the Niagara Falls Power Station.\* (12) Jan. 16.  
 The Largest Electric Water Power System in New England.\* (27) Jan. 17.  
 German Ozone Waterworks.\* Dr. Ig. Erlwein. (27) Jan. 17.  
 Water Power on the Winooski.\* Alton D. Adams. (27) Jan. 24.  
 The Garvin's Falls Station of the Manchester Traction, Light and Power Company.\* W. V. Batson. (14) Jan. 24.  
 Water Waste Detection in New York City.\* (14) Jan. 31.  
 Completion of the Nile Dams.\* John Ward. (10) Feb.  
 The Utilisation of Mountain Water Powers.\* Paul Letheule. (9) Feb.  
 The Cole-Flad Photo-Pitometer and Its Use in Studying Water Consumption and Waste.\* (13) Feb. 5.  
 The New Mill Creek Power Plant of the Edison Electric Co., near Redlands, Cal.\* E. Duryee. (13) Feb. 5.  
 Compte Rendu du Congrès de la Houille Blanche. Ch. Pinat. (32) Nov.  
 La Nouvelle Usine Hydro-Électrique des Chutes du Niagara.\* (33) Jan. 3.  
 Le Laboratoire d'Hydraulique Fluviale de l'Institut Technique de Carlsruhe.\* (33) Jan. 24.

**Waterways.**

- Electrical Haulage on Canals. E. W. Marchant. (Paper read before the Inst. of Elec. Engrs.) (47) Jan. 10.  
 Proposed Retaining Barriers for the Debris from Hydraulic Mining in the Yuba River, Cal.\* (13) Jan. 15.

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\* Illustrated.



## AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1852.

## PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced  
in any of its publications.

## SOCIETY AFFAIRS.

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**March 4th, 1903.**—The meeting was called to order at 8.50 P. M., President Noble in the chair; Chas. Warren Hunt, Secretary; and present, also, 96 members and 28 guests.

The minutes of the Annual Meeting, and of the meetings of February 4th and 18th, 1903, were approved as printed in *Proceedings* for February, 1903.

Messrs. R. A. MacGregor and F. F. Harrington were appointed tellers to canvass the vote on the proposed amendment to the Constitution.

A paper entitled "A High-Voltage Power Transmission," by M. H. Gerry, Jr., Assoc. M. Am. Soc. C. E., was presented by the Secretary, and discussed by Messrs. F. O. Blackwell, P. H. Thomas, W. B. Potter and J. R. McKee.

The tellers appointed to canvass the ballots on the proposed amendment to the Constitution, relating to the method of election of members,\* reported as follows:

Total number of ballots received.....	447
Not entitled to vote.....	2
Ballots not signed.....	9
	— 11
	—
	436
Voted aye.....	401
Voted nay.....	26
Blank.....	9
	— 436

The President announced that the proposed amendment was carried, as it had received an affirmative vote of more than two-thirds of all ballots cast, as provided by the Constitution (Sec. 5, Art. IX).

Ballots for membership were canvassed, and the following candidates elected:

#### AS MEMBERS.

FRANK HARVEY ENO, Columbus, Ohio.  
 HARRY FOOTE HODGES, Washington, D. C.  
 WILLIAM BENJAMIN JACKSON, Madison, Wis.  
 ALBERT FERDINAND REICHMANN, Chicago, Ill.  
 JUNNOSUKE YAMAGUCHI, Kobe, Japan.

#### AS ASSOCIATE MEMBERS.

MAURICE FRITCHLEY BROWN, Boston, Mass.  
 GEORGE EDWARD HOWE, Glens Falls, N. Y.  
 ARTHUR BENJAMIN ILSLEY, Boston, Mass.  
 FREDERIC ARNOLD KUMMER, New York City.  
 WILLIAM SUTTON MCFETRIDGE, Parkersburg, W. Va.  
 TAKEJIRO SHIMA, New York City.  
 ALBERT FRANKLIN SICKMAN, Holyoke, Mass.  
 EVERETT BROOMALL WILSON, Newark, N. J.

The Secretary announced that at the meeting of the Board of Direction, March 3d. 1903, the reconsideration ballot, on the application of Frank Taylor Chambers, Assoc. M. Am. Soc. C. E., for transfer to the grade of Member, was canvassed, and that Mr. Chambers was elected a Member.

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\* See *Proceedings*, Vol. XXIX, p. 36.

The Secretary announced the election of the following candidates by the Board of Direction on March 3d, 1903:

AS JUNIORS.

BRUCE BORLAND, Three Lakes, Wis.

CHARLES FRANK CLASS, Philadelphia, Pa.

JOHN CLAUSNITZER, New York City.

ROSSITER RAYMOND FERNOW, Ithaca, N. Y.

HARRY MACY HARPS, Fort Dodge, Iowa.

CALEB HYATT, Scarsdale, N. Y.

JOHN DOUGLAS MATHESON, New York City.

Adjourned.

**March 18th, 1903.**—The meeting was called to order at 8.45 p. m., President Noble in the chair; Chas. Warren Hunt, Secretary; and present, also, 126 members and 17 guests.

A paper entitled, "Sand-Blast Cleaning of Structural Steel," by George W. Lilly, Assoc. M. Am. Soc. C. E., was presented by the author.

Written discussions on the paper from Messrs. Charles E. Fowler, William A. Polk and J. P. Snow were presented by the Secretary.

The subject was discussed verbally by Messrs. Theodore Belzner, Theodore Paschke, A. H. Sabin, Henry B. Seaman and the author.

The Secretary announced the death of the following members:

ALFRED L. RIVES, elected Member September 4th, 1872; died February 27th, 1903.

BENJAMIN HARRISON FLYNN, elected Junior October 2d, 1900; died March 1st, 1903.

WILLIAM BUEL FRANKLIN, elected Member April 1st, 1874; died March 8th, 1903.

Adjourned.



## OF THE BOARD OF DIRECTION.

(Abstract.)

**March 3d, 1903.**—8.35 p. m.—President Noble in the chair; Chas. Warren Hunt, Secretary, and present, also, Messrs. Briggs, Craven, Croes, Davison, Knap, Knichling, Osgood, Pegram, Schneider and Wilgus.

The seven geographical districts, into which the membership of the Society is divided, were established for the next year, the same as in 1902.

The resignation of E. H. Goodman, Assoc. Am. Soc. C. E., was accepted.

The following Committee to take charge of the local arrangements for the Thirty-fifth Annual Convention, to be held at Asheville, N. C., was appointed: Messrs. J. L. Ludlow, William Cain, George W. Frank, William Moncure, J. Imbrie Miller, W. B. W. Howe, Arthur Pew, E. T. D. Myers, Wilbur F. Foster, J. A. Montgomery.

Ballots on the reconsideration of the ballot on the application of Frank T. Chambers, M. Am. Soc. C. E., for transfer to the grade of Member, were canvassed, and Mr. Chambers was elected a Member.

Applications were considered, and other routine business transacted.

Seven candidates for admission as Junior were elected.\*

Adjourned.

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\* See page 101.

## ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

## MEETINGS.

**Wednesday, April 1st, 1903.**—8.30 p. m.—A regular business meeting will be held. Ballots for membership will be canvassed, and two papers will be presented for discussion, as follows: "The Filtration Works of the East-Jersey Water Company, at Little Falls, New Jersey," by George W. Fuller, Assoc. M. Am. Soc. C. E.; and "Automatic Modules for Regulating the Speed of Filtration," by Charles Anthony, Jr., M. Am. Soc. C. E. These papers were printed in *Proceedings* for February, 1903.

**Wednesday, April 15th, 1903.**—8.30 p. m.—At this meeting a paper, by Sherman M. Turrill, Assoc. Am. Soc. C. E., entitled "An Investigation of the Properties of Brick Under Different Physical Conditions," will be presented for discussion. This paper is printed in this number of *Proceedings*.

**Wednesday, May 6th, 1903.**—8.30 p. m.—A regular business meeting will be held. Ballots for membership will be canvassed, and two papers will be presented for discussion, as follows: "A Small Rock-Fill Dam," by H. deB. Parsons, M. Am. Soc. C. E.; and "Deflection of Beams with Variable Moments of Inertia," by C. W. Hudson, M. Am. Soc. C. E. These papers are printed in this number of *Proceedings*.

## ANNUAL CONVENTION OF 1903.

The Thirty-fifth Annual Convention of the Society will be held at Asheville, N. C., during the week beginning June 8th, 1903. The following have been appointed as a Local Committee of Arrangements:

J. L. LUDLOW,

WILLIAM CAIN,

GEORGE W. FRANK,

WILLIAM MONCURE,

J. IMBRIE MILLER,

W. B. W. HOWE,

ARTHUR PEW,

E. T. D. MYERS,

WILBUR F. FOSTER,

J. A. MONTGOMERY.

### TOPICS FOR DISCUSSION AT THE ANNUAL CONVENTION.

At the last four Annual Conventions no formal papers have been presented, but, instead, topics of general interest have been discussed. The interest which these discussions have aroused has shown that they are appreciated, and, for the coming Convention, the Committee on Publications would be glad to receive from members suggestions as to suitable topics.

The following list, of the subjects which have already been discussed at Conventions, is here printed, in order to give some idea of the kind of subjects desired:

#### LIST OF SUBJECTS PRESENTED FOR DISCUSSION AT THE LAST FOUR ANNUAL CONVENTIONS.

- “ Should the use of the method of Wheel Concentrations be discontinued in determining the Stresses in Railroad Bridges?
- “ In view of present knowledge of the Effect of Repeated Applications of Load, should Fatigue Formulas be used in Bridge Design?
- “ (a) Should Stream Contamination by the Sewage of Cities be absolutely prohibited by law?
- “ (b) Should the Purification of the Sewage of Cities be compulsory, and is this feasible for Large Cities?
- “ (c) Is Filtration the coming solution of the Pure-Water Question for Cities?
- “ What is the Proper Friction Coefficient for use in the design of Riveted Steel Pipe?
- “ What are the economic conditions under which Electricity may be profitably substituted for Steam in the operation of Branch Railroad Lines, and what are the engineering requirements to be considered in such substitution?
- “ What is the present development of the so-called Telferage System for moving either Freight or Passengers? What are the conditions under which that System is preferable to movement by Rail, and what is its adaptability to still further application in competition with Rail Lines?
- “ Height of Buildings.
  - (1) What considerations should limit the height of buildings?
  - (2) Do recent developments in construction, sanitation, intercommunication and economy of administration, warrant the removal of all restrictions?
- “ Recent Practice in Rails.
 

The progressive increase in weight; the increase in hardness, particularly in carbon; the sections in most general use; the effect of changes in weight, composition and section.
- “ Filtration of Water for Public Use.
 

The several processes now used for the removal of objectionable matter; their comparative sanitary effect, cost and reliability.

“Do the interests of the profession, and the duty of its members to the public, require that only those who are competent be allowed to practice as Civil Engineers? Under what authority, through what agency, and upon what evidence of competency, should applicants be admitted to the practice of Civil Engineering?”

“Steel-Concrete Construction.

What stress in tension and compression should be allowed in concrete?

What is the proper modulus of elasticity of concrete?

In Steel-Concrete Arches:

(1) What should be the ratio of steel section to concrete section, and what is the best form and disposition of the former?

(2) What consideration should be given to temperature changes and consequent stresses?

(3) What are the best proportions for concrete, and what is the best method of placing it?

“The Decolorization of Water.

When is it necessary? How may it be accomplished?

“The Consumption of Water in Municipal Supplies and the Restriction of Waste.

“In contract work, either public or private, is it preferable to make separate contracts for the different branches of trades involved, or to combine all under one general contract?

“Is it possible and desirable to keep accounts of work in progress in such a manner as to ascertain unit costs on each class of work?

“Is steel susceptible of being made as permanent a building material as masonry?

“In view of the numerous disasters caused by the contracting of channels, or the damming of small streams, should non-navigable streams be under the control of the National Government?

“Should the National Government undertake the construction and operation of irrigation works?

“Should Engineering Practice be regulated by a code of ethics? If so, how can such a code be established?”

## ACCESSIONS TO THE LIBRARY.

From February 11th to March 10th, 1903.

## DONATIONS.\*

## LATHES, SCREW MACHINES, BORING AND TURNING MILLS.

A Practical Treatise on the Design and Construction of Turning Machines, including Lathes, Automatic Screw Machines, Boring and Turning Mills, and their Accessories. By Thomas R. Shaw. Cloth, 9 x 6 ins., 10 + 649 + 5 pp., illus. The Scientific Publishing Company, Manchester, 1903. 15 shillings, net.

The object of this work is to review in detail types of the many varied machine tools in use for the working into shape of metals, and to give constructive details of the more important mechanisms and devices, which, it is hoped, will prove helpful to those engaged in various branches of engineering, and make easier the solution of problems in design which are presenting themselves continually in various guises in everyday practice. It was considered that the best way to treat the subject would be to give examples from actual practice, showing the different mechanisms with their respective constructional surroundings. This plan has been adopted as far as practicable. The Contents are: General Notes on Design and Arrangement; Principle of the Lathe; Small Lathes with Some Special Features; On Screw Threads; American Lathes; Lathes for Special Purposes; Small Lathes for Accurate Work; Electrically-Driven Lathes; Summary of Lathe Design; Turret Lathes; Examples of Hollow Turrets; Vertical Turret Lathes; Full Automatic Screw Machines; Heavy Lathes; Boring and Turning Mills. There is an index of five pages.

## IRON AND STEEL, IRON ORE, AND COAL STATISTICS FOR THE UNITED STATES, GREAT BRITAIN, GERMANY, FRANCE, AND BELGIUM.

Revised to the end of 1901. By James M. Swank. Cloth, 6 x 4 ins., 32 pp. Philadelphia, The American Iron and Steel Association, 1902.

This compilation of Iron and Steel, Iron Ore, and Coal Statistics for the United States and four European countries is presented to the members of the American Iron and Steel Association as a souvenir of the completion of the author's thirty years of continuous service, first as Secretary and afterwards as General Manager of the Association. The pamphlet also contains the production of iron ore in Algeria as far back as authentic statistics are available, the production of coke in the United States at the close of 1901, and of the shipments of Connellsville and Pocahontas Flat Top Coke, statistics of the shipments of Lake Superior iron ore and of Cuban iron ore to the same date; also complete statistics of the imports of iron ore into the United States at the close of 1901.

## ENGINEERING CONTRACTS AND SPECIFICATIONS

Including a Brief Synopsis of the Law of Contracts, and Illustrative Examples of the General and Technical Clauses of Various Kinds of Engineering Specifications. Designed for the Use of Students, Engineers, and Contractors. By J. B. Johnson, M. Inst. C. E., M. Am. Soc. C. E., M. Am. Soc. M. E. Third Edition Revised. Cloth, 9 x 6 ins., 566 pp., por. Engineering News Publishing Co., New York, 1903. \$6.00.

The preface states that in the present edition a general revision of Part IV has been made, in addition to minor changes in the other portions of the book. Several complete specifications have been entirely changed, or replaced, and many new ones have been added. Two new appendices are given on The Engineer as an Expert Witness, and the Standard Specifications for Iron and Steel proposed by the American Committee of the International Association for Testing Materials. By these additions the book has been enlarged 144 pages. The Parts are: Synopsis of the Law of Contracts; Engineering Specifications and Accompanying Documents; Specific Descriptive, or Technical Clauses in Specifications; Illustrative Examples of Complete Contracts and Specifications. There is an index of six pages.

\* Unless otherwise specified, books in this list have been donated by the Publishers.



**STATICS BY ALGEBRAIC AND GRAPHIC METHODS.**

Intended Primarily for Students of Engineering and Architecture.  
By Lewis J. Johnson, Assoc. M. Am. Soc. C. E. Cloth, 9 x 6 ins.,  
S. 133 pp., 6 plates, illus. New York, John Wiley & Sons, 1903.  
\$2.00.

It is stated in the preface that this volume has been written in the hope of helping students to acquire a knowledge of statics which will include the power to apply it correctly in professional work. To this end an attempt has been made to carry out several specific purposes, among which are the following: 1. To give much attention to the starting points of the science, and to make as clear as possible the course of deduction therefrom. 2. To point out the inherent mathematical limitations of pure statics, and to show how all its important problems are solved. 3. To develop algebraic and graphic methods of solution side by side, and with equal thoroughness. 4. To present a graded set of problems illustrating not only universal principles, but also how statics is used in engineering practice. The chapter headings are: Definitions and Preliminaries; Notation and Conventions; Parallelogram of Forces and its Derivatives; Algebraic and Graphic Statements of the Condition of Equilibrium, with Applications; Scope of Pure Statics; Solutions of Statical Problems; Additional General Topics and Processes; Centers of Gravity; Stress; Structures; Stresses in Non-Framed Structures; Stresses in Framed Structures; Additional Topics and Examples.

**LIME AND CEMENT INDUSTRIES OF NEW YORK.**

By Heinrich Ries. Chapters on the Cement Industry in New York.  
By Edwin C. Eckel. Cloth, 10 x 7 ins., pp. 641-968, 102 plates. Albany,  
University of the State of New York, 1901. (Bulletin of the New York  
State Museum, No. 44, Vol. 8. November, 1901.) (Donated by F. J.  
H. Merrill.)

The Contents are: Origin of Limestone; Chemical Composition; Geologic Occurrence; Prospecting; Color of Limestone; Mineralogic Composition; Uses of Limestone; Uses of Lime; Cement; Geology of New York Limestones; Limestone Occurrence by Counties; Cement Industry in New York State; Producers of Lime and Natural Cement; Producers of Natural Rock Cement; History of the Portland Cement Industry in New York State; Manufacture of Portland Cement in New York State; Tests of Cements, Made by the State Engineer, 1897-1900; Key to Tables of Limestone Analyses; Tables of Limestone Analyses. There is an index of ten pages.

Gifts have also been received from the following:

Am. Soc. Mech. Engrs. 1 pam., 3 bound vol.	Midland Ry. Co. 1 pam.
Assoc. Amicale des Anciens Elèves de l'Ecole Centrale. 1 vol.	Min. Soc. of Nova Scotia. 1 pam.
Assoc. of Ry. Supts. of Bridges and Buildings. 1 pam.	N. J.—Commr. of Pub. Roads. 1 bound vol.
Augusta, Ga.—City Council. 1 pam.	New York Univ. 1 vol.
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Great Britain—Patent Office. 10 pam.	Sherman, Chas. W. 1 pam.
Hutton, N. H. 1 pam.	Simla, India—Director of Ry. Construction. 2 bound vol.
Inst. of Civ. Engrs. 2 bound vol.	Soc. Belge des Ingénieurs et des Industriels. 1 pam.
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Königliche Technische Hochschule zu Berlin. 1 pam.	U. S. Com. of Education. 1 bound vol.
Kummer, F. A. 1 bound vol.	U. S. Corps of Engrs. 28 spec.
Leominster, Mass.—Water Board. 1 pam.	U. S. Interstate Commerce Comm. 1 pam.
Marburg, Edgar. 1 vol.	U. S. Office of Naval War Records. 7 pam.
Marston, A. 1 pam.	Victoria—Water Supply Dept. 1 bound vol.
Middletown, Conn.—Board of Water Commrs. 1 pam.	Webster, Albert L. 1 bound vol.
	Young Men's Christian Assoc. of N. Y. 1 pam.

**BY PURCHASE.**

**Der Brückenbau.** Von Franz Tschertou. Wiesbaden, C. W. Kreidel, 1903.

**Konstruktionslehre der einfachen Maschinenteile.** Von O. A. Grove. 2 vol. Leipzig, S. Hirzel, 1902.

**Das Eisenbahngleis.** Von A. Haarmann. Kritischer Teil. Leipzig, Wilhelm Engelmann, 1902.

**Der Praktische Maurer.** (Maurer- und Steinmetzarbeiten). Ein Hand- und Nachschlagebuch aus der Praxis für die Praxis. Von Dr. E. A. Menzel. 12. vielfach verbesserte und vermehrte Auflage. Herausgegeben von Otto Alisch, A. Eckardt, Martin Köster, P. Schmidt. Leipzig, I. I. Arnd, 1902.

**Elasticität und Festigkeit.** Die für die Technik wichtigsten Sätze und deren erfahrungsmässige Grundlage. Von C. Bach. Vierte, vermehrte Auflage. Berlin, Julius Springer, 1902.

**Experimental Engineering and Manual for Testing.** For Engineers and for Students in Engineering Laboratories. By Rolla C. Carpenter. Fifth Revised and Enlarged Edition. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1902.

#### SUMMARY OF ACCESSIONS.

From February 11th to March 10th, 1903.

Donations (including 8 duplicates).....	97
By purchase.....	7
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Total.....	104

## MEMBERSHIP.

## ADDITIONS.

## MEMBERS.

			Date of Membership.
CHAMBERS, FRANK TAYLOR			
Civ. Engr., U. S. Navy, U. S. Navy Yard,	Assoc. M.	April 6, 1898	
Philadelphia, Pa. ....	M.	Mar. 3, 1903	
COOLEY, MAURICE WURTZ			
Mgr., The National Contr. Co., 246 First St.,	Assoc. M.	Mar. 7, 1894	
Cambridge, Mass. ....	M.	Dec. 3, 1902	
DATESMAN, GEORGE ELVIN			
Prin. Asst. Engr., Bureau of Surveys, 416 City Hall,			
Philadelphia, Pa. ....		Feb. 4, 1903	
HODGES, HARRY FOOTE			
Maj., Corps of Engrs., U. S. A., 1812 N St., N. W., Wash-			
ington, D. C. ....		Mar. 4, 1903	
JACKSON, WILLIAM BENJAMIN			
Madison, Wis. ....		Mar. 4, 1903	
RANDOLPH, ISHAM			
Chf. Engr., San. Dist. of Chicago, Room 1010, Security			
Bldg., Chicago, Ill. ....		Feb. 4, 1903	
REICHMANN, ALBERT FERDINAND			
Asst. Engr., Western Div., Am. Bridge Co.,	Jun.	April 30, 1895	
1318 Monadnock Bldg., Chicago, Ill. ....	Assoc. M.	Oct. 5, 1898	
	M.	Mar. 4, 1903	

## ASSOCIATE MEMBERS.

BROWN, MAURICE FRITCHLEY			
Chf. Engr., Boston Bridge Works, 47 Winter St., Boston,			
Mass. ....		Mar. 4, 1903	
BRYNN, PER			
Care, Am. Bridge Co., 51st St., Pittsburg, Pa. ....		Feb. 4, 1903	
HOWE, GEORGE EDWARD			
Asst. Engr., Hudson River Water Power Co., Glens Falls,			
N. Y. ....		Mar. 4, 1903	
HOWE, JOSEPH MILTON			
Houston, Tex. ....		Feb. 4, 1903	
McFETRIDGE, WILLIAM SUTTON			
Asst. Chf. Engr., Little Kanawha R. R. Co.,	Jun.	May 3, 1898	
Parkersburg, W. Va. ....	Assoc. M.	Mar. 4, 1903	
PAINE, HIBBARD ATWILL			
Res. Engr., C., O. & W. R. R., Chandler, Okla. T. ....		Feb. 4, 1903	
ROSS, THOMAS ALEXANDER			
Engr. in Chg., Shanghai Woosung Ry. Extension, Box			
185, British P. O., Shanghai, China. ....		Dec. 3, 1902	
SICKMAN, ALBERT FRANKLIN			
Holyoke, Mass. ....		Mar. 4, 1903	

	Date of Membership
STATTON, EDWARD MOSES 423 First Kansas St., Independence, Mo.....	Feb. 4, 1903
WICKES, EDWARD DANA Min. Engr., The Low Moor Iron Co. of Va., Low Moor, Va.....	Dec. 3, 1902
WILSON, EVERETT BROOMALL 200 Peshine Ave., Newark, N. J.....	Mar. 4, 1903

## ASSOCIATES.

BERNEGAU, RUDOLF CASPAR CARL MARIE Treas., Keuffel & Esser Co., 127 Fulton St., New York City.....	Feb. 3, 1903
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## JUNIORS.

ADEY, JOHN SEAGER 445 Lenox Ave., New York City.....	Feb. 3, 1903
BORLAND, BRUCE 2027 Prairie Ave., Chicago, Ill.....	Mar. 3, 1903
CETTI, CAROLUS HERMANN ZANE- Fort Worth, Tex.....	Feb. 3, 1903
CLASS, CHARLES FRANK 2610 North Jessup St., Philadelphia, Pa.....	Mar. 3, 1903
CROOK, JOHN ANTHONY Chf. Engr., The John Gilligan Co., Falls City, Nebr. ....	Feb. 3, 1903
HYATT, CALEB Scarsdale, N. Y.....	Mar. 3, 1903
KAUFFMAN, VERNET ALBERT Care, H. A. Sumner, Majestic Bldg., Denver, Colo.....	Feb. 3, 1903
QUANZ, RUDOLPH 507 Central Ave., Brooklyn, N. Y.....	Sept. 2, 1902
SMITH, GEORGE EDSON PHILIP Prof. of Physics and Eng., Univ. of Arizona, Tucson, Ariz.	Feb. 3, 1903
STEPATH, CHARLES UNDERHILL 154 West 122d St., New York City.....	Feb. 3, 1903
WALKER, EDWARD LLOYD Care, Jersey City Water Supply Co., 158 Ellison St., Pat- erson, N. J.....	Feb. 3, 1903

## CHANGES OF ADDRESS.

## MEMBERS.

BARBER, WILLIAM DAVIS.....	Asst. Engr. in Chg., Div. of Constr. and Repairs, 323 City Hall, Chicago, Ill.
BEARDSLEY, JAMES WALLACE .....	Cons. Engr. to the Comm., and Chf. of the Bureau of Eng., Palace, Manila, Philip- pine Islands.

COOMBS, STEPHEN ELBRIDGE.....	4025 McPherson Ave., St. Louis, Mo.
DAVIS, CHARLES E. L. B.....	Lt.-Col., Corps of Engrs., U. S. A., Chf. Engr. Officer of the Div., Manila, Philip- pine Islands.
DUNN, DANIEL BURKE.....	Care, S. A. L. Ry., Dallas, Ga.
GATES, HORACE DELPHOS.....	Asst. to City Engr., 311 Lyon St., San Fran- cisco, Cal.
HAYDEN, WILLIAM WALLACE .....	Asst. Engr., Y. & M. V. R. R., Poplar St. Depot, Memphis, Tenn.
HURRY, EDWARD HENRY.....	1 Broadway, Room 122, New York City.
INGALLS, OWEN LOVEJOY.....	City Engr., Manila, Philippine Islands.
KLEINBECK, AUGUST GUSTAVE.....	710 North State St., Litchfield, Ill.
LINVILLE, JACOB HAYS.....	Evergreen Lodge, Lansdowne, Pa.
MACNAUGHTON, JAMES.....	Care, MacIntyre Iron Co., 26 Cortlandt St., New York City.
MILLER, CHARLES HENRY.....	Engr. with McClintic-Marshall Const. Co. of Rankin, Pa.; 727 East End Ave., Pitts- burg, Pa.
PARKER, HAROLD .....	South Lancaster, Mass.
PEW, ARTHUR.....	Auburn, Ala.
SMITH, WILLIAM CHARLES.....	With Richards-Lundeen Co., Gen. Contrs., Minneapolis, Minn.
STANFORD, HOMER REED.....	Civ. Engr., U. S. N., Care, Bureau of Yards and Docks, Navy Dept., Washington, D. C.
STANTON, ROBERT BREWSTER .....	66 Broadway, New York City.
TOMLINSON, SAM.....	1 Raffles Pl., Singapore, Straits Settlements.
TOWNSEND, CURTIS McDONALD.....	Maj., Corps of Engrs., U. S. A., Manila, Philippine Islands.
TRUNDLE, HORATIO HARTLEY.....	Mocksville, Davie Co., N. C.
VALUE, BEVERLY REID.....	Care, Toronto & Niagara Power Co., Niagara Falls, Ont., Canada.
WATSON, WILLIAM PARSONS.....	Prin. Asst. Engr., Mo. Pac. Ry. Co., St. Louis, Mo.
WEBB, GEORGE HERBERT.....	Asst. Engr., Michigan Central R. R., Kala- mazoo, Mich.
WILLIAMS, CYRUS JOHN RICHARD.....	Engr., Lyttelton Harbour Board, Christ- church, New Zealand.
YATES, PRESTON KING.....	First Asst. Engr., The Lake Shore & Michi- gan Southern R. R., 67 Spangler Ave., Cleveland, Ohio.

## ASSOCIATE MEMBERS.

BANCE, CHARLES WILLIAM.....	Asst. Engr., Jersey City Water Supply Co., 156 Ellison St., Paterson, N. J.
BOGGS, JOHN INNERARITY.....	Chf. Engr., Arkansas Southwestern Ry., Gurdon, Clark Co., Ark.



BORIGHT, WILLIAM PARSONS.....	Care, T. H. Riddle Constr. Co., Ravenna, Ohio.
CARLILE, THOMAS JENKS.....	Engr., Beaver Creek R. R. & Lumber Co., Davis, W. Va.
CUNNINGHAM, JOSEPH HOOKER....	Res. Engr., Puget Sound Power Co., Tacoma, Wash.
EDWARDS, FREDERICK.....	Asst. Prof. of Civ. Eng., Union Coll., Schenectady, N. Y.
FAIN, JAMES RHEA.....	Norfolk, Nebr.
FRENCH, FRANK CHAUNCEY.....	Belen, N. Mex.
HENRY, PHILIP WALTER.....	Vice-Pres., Medina Quarry Co., 150 Nassau St., New York City.
MOORE, CHARLES GILLINGHAM....	189 Cleveland Ave., Buffalo, N. Y.
NEWBERRY, SPENCER BAIRD.....	Gen. Mgr., Sandusky Portland Cement Co., Bay Ridge, Ohio.
NICHOLS, HENRY FRANCIS.....	Gen. Mgr. and Engr., James Hill & Sons, 63 Grenfell St., Adelaide, South Australia.
NOBLE, FREDERICK CHARLES.....	439 West 123d St., New York City.
OLBERG, CHARLES REAL.....	Asst. Engr., U. S. Geological Survey, Washington, D. C.
PHILLIPS, HOWARD CRATHORNE....	Engr., Western Grand Div., A., T. & S. F. Ry., La Junta, Colo.
ROSEWATER, WILLIAM MARCUS....	Chf. Draftsman, The Bucyrus Co., Gen. Delivery, Pittsburg, Pa.
SCHENK, CARL LOUIS EDUARD....	Contr. Engr., Exeter Machine Works, Rural Route No. 2, Oakdale, Pa.
TABER, GEORGE AYMAR.....	Asst. Engr., Rapid Transit R. R. Comm., 312 West 122d St., New York City.
TURNER, GEORGE DALLAS BAIRD...	Vice-Pres. and Gen. Mgr., J. I. C. Mining & Milling Co., 317 Atlas Blk., Salt Lake City, Utah.

## ASSOCIATES.

TURRILL, SHERMAN MARSH.....	New Milford, Conn.
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## JUNIORS.

ARMSTRONG, ALEXANDER FLOYD..	Office of City Engr., Manila, Philippine Islands.
DIMOND, JAMES RENWICK.....	128 West 33d St., New York City.
FULLER, CARL HAMILTON .....	Eng. Dept., Koken Iron Works, St. Louis, Mo.
PEARSE, LANGDON.....	177 Sixth Ave., Brooklyn, N. Y.
PERRING, HENRY GARFIELD.....	Draftsman, Phila. Rapid Transit Co., 619 North 48th St., Philadelphia, Pa.
THOMPSON, WILFORD ASHFORD....	Engr., Imperial Constr. Co., Brawley, via Imperial, Cal.

## RESIGNATIONS.

## ASSOCIATES.

	Date of Resignation.
GOODMAN, EDWARD HARRIS.....	March 3d, 1903

## DEATHS.

FLYNN, BENJAMIN HARRISON	...Elected Junior, October 2d, 1900; died March 1st, 1903.
FRANKLIN, WILLIAM BUEL .....	Elected Member, April 1st, 1874; died March 8th, 1903.
RIVES, ALFRED L.....	Elected Member, September 4th, 1872; died February 27th, 1903.

## MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(February 11th to March 10th, 1903.)

NOTE. — *This list is published for the purpose of placing before the members of the Society the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

### LIST OF PUBLICATIONS.

*In the subjoined list of articles references are given by the number prefixed to each journal in this list.*

- |  |  |
|--|--|
| (1) <i>Journal, Assoc. Eng. Soc.</i> , 357 South Fourth St., Philadelphia, Pa., 30c.             | (32) <i>Mémoires et Compte Rendu des Travaux</i> , Soc. Ing. Civ. de France, Paris, France.  |
| (2) <i>Proceedings, Eng. Club of Phila.</i> , 1122 Girard St., Philadelphia, Pa.                 | (33) <i>Le Génie Civil</i> , Paris, France.  |
| (3) <i>Journal, Franklin Inst.</i> , Philadelphia, Pa., 50c.                                     | (34) <i>Portefeuille Économique des Machines</i> , Paris, France.                            |
| (4) <i>Journal, Western Soc. of Engrs.</i> , Monadnock Block, Chicago, Ill.                      | (35) <i>Nouvelles Annales de la Construction</i> , Paris, France.                            |
| (5) <i>Transactions, Can. Soc. C. E.</i> , Montreal, Que., Canada.                               | (36) <i>La Revue Technique</i> , Paris, France.  |
| (6) <i>School of Mines Quarterly</i> , Columbia Univ., New York City, 50c.                       | (37) <i>Revue de Mécanique</i> , Paris, France.  |
| (7) <i>Technology Quarterly</i> , Mass. Inst. Tech., Boston, Mass., 75c.                         | (38) <i>Revue Générale des Chemins de Fer et des Tramways</i> , Paris, France.               |
| (8) <i>Stevens Institute Indicator</i> , Stevens Inst., Hoboken, N. J., 50c.                     | (39) <i>Railway Master Mechanic</i> , Chicago, Ill., 10c.                                    |
| (9) <i>Engineering Magazine</i> , New York City, 25c.  | (40) <i>Railway Age</i> , Chicago, Ill., 10c.  |
| (10) <i>Cassier's Magazine</i> , New York City, 25c.   | (41) <i>Modern Machinery</i> , Chicago, Ill., 10c.   |
| (11) <i>Engineering</i> (London), W. H. Wiley, New York City, 25c.                               | (42) <i>Transactions, Am. Inst. Elec. Engrs.</i> , New York City, 50c.                       |
| (12) <i>The Engineer</i> (London), International News Co., New York City, 35c.                   | (43) <i>Annales des Ponts et Chaussées</i> , Paris, France.                                  |
| (13) <i>Engineering News</i> , New York City, 15c.   | (44) <i>Journal, Military Service Institution</i> , Governor's Island, New York Harbor, 50c. |
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| (17) <i>Street Railway Journal</i> , New York City, 35c.   | (54) <i>Transactions, Am. Soc. C. E.</i> , New York City, \$5.                               |
| (18) <i>Railway and Engineering Review</i> , Chicago, Ill., 10c.                                 | (55) <i>Transactions, Am. Soc. M. E.</i> , New York City, \$10.                              |
| (19) <i>Scientific American Supplement</i> , New York City, 10c.                                 | (56) <i>Transactions, Am. Inst. Min. Engrs.</i> , New York City, \$5.                        |
| (20) <i>Iron Age</i> , New York City, 10c.   | (57) <i>Colliery Guardian</i> , London, England.   |
| (21) <i>Railway Engineer</i> , London, England, 25c.   | (58) <i>Proceedings, Eng. Soc. W. Pa.</i> , 410 Penn Ave., Pittsburg, Pa., 50c.              |
| (22) <i>Iron and Coal Trades Review</i> , London, England, 25c.                                  | (59) <i>Transactions, Mining Inst. of Scotland</i> , London and Newcastle-upon-Tyne.         |
| (23) <i>Bulletin, American Iron and Steel Assoc.</i> , Philadelphia, Pa.                         | (60) <i>Municipal Engineering</i> , Indianapolis, Ind., 25c.                                 |
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| (25) <i>American Engineer</i> , New York City, 20c.  | (62) <i>American Manufacturer and Iron World</i> , 59 Ninth St., Pittsburg, Pa.              |
| (26) <i>Electrical Review</i> , London, England.   | (63) <i>Minutes of Proceedings, Inst. C. E.</i> , London, England.                           |
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| (28) <i>Journal, New England Water-Works Assoc.</i> , Boston, \$1.                               | (65) <i>Official Proceedings, New York Railroad Club</i> , Brooklyn, N. Y., 15c.             |
| (29) <i>Journal, Society of Arts</i> , London, England, 15c.                                     | (66) <i>Journal of Gas Lighting</i> , London, England, 15c.                                  |
| (30) <i>Annales des Travaux Publics de Belgique</i> , Brussels, Belgium.                         | (67) <i>Cement and Engineering News</i> , Chicago, Ill., 25c.                                |
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 Electric Water Power at Manchester, N. H., Mills.\* (27) Feb. 14.  
 Royal Commission Studies on Pollution and Self-Purification of the River Severn. (13) Feb. 19.  
 1,000-H. P. Water-Power Electric Plant at Manchester, Conn.\* (27) Feb. 21.  
 The Water Supply of London. (10) Serial beginning Feb. 21.  
 The Ozone Water-Works at Wiesbaden and Paderborn.\* (46) Feb. 21.  
 The Purification of Feed Water. J. B. Greer. (Paper read before the Ry. Club of Pittsburgh.) (18) Feb. 28.



**Water Supply—(Continued).**

- The Construction of the Asyut Dam; Nile Irrigation Works.\* (46) Feb. 28.  
 Hydrant Rental. D. H. Sawyer. (60) Mar.  
 A Hydro Electric Power Plant in Newfoundland.\* Earl E. Boardway. (27) Mar. 7.  
 A Water-Power Plant near Grenoble, France. (14) Mar. 7.  
 Air Testing in Tunnel Construction (Cincinnati Water-Works).\* Joseph W. Ellms.  
 (Paper presented to the Amer. Pub. Health Assoc.) (14) Mar. 7.  
 Barrages à Parements Rectilignes. Gustave Cadart. (43) 3e Trimestre, 1902.  
 L'Alimentation d'Eau des Villes. E. d'Esménard. (36) Serial beginning Jan. 25.

**Waterways.**

- Plant and Methods Employed in Excavating Ambrose Channel, New York Harbor. (13) Feb. 12.  
 The Concrete-Steel Culvert for Stream Diversion at Kalamazoo, Mich.\* Geo. S. Pierson.  
 M. Am. Soc. C. E. (13) Feb. 12.  
 A Deep Waterway from the Lakes to the Atlantic. (13) Feb. 26.  
 Impounding Mining Debris in Yuba River, California.\* Franklin Riffe, M. Am. Soc.  
 C. E. (14) Feb. 28.  
 Modern Machinery for Excavating and Dredging.\* A. W. Robinson. (9) Mar.  
 Note sur la Construction d'une Nouvelle Écluse à Port-à-l'Anglais sur la Haute-Seine.  
 M. Alby. (43) 3e Trimestre, 1902.  
 IXe Congrès International de Navigation Tenu à Düsseldorf.\* L. Coiseau. (32) Dec.  
 Les Ports Principaux du Nord et de l'Ouest de la France: Les Portes d'Écluse: Rapport  
 de Mission. A. J. Pierrot and J. Melotte. (30) Feb.  
 Les Dragages par Succion dans l'Estuaire de la Seine.\* L. Sekutowicz. (33) Feb. 14.  
 Agrandissement de l'Usine Hydraulique du Port de Bordeaux.\* Ch. Dantin. (33)  
 Feb. 21.

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\* Illustrated.





## AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1852.

## PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

## SOCIETY AFFAIRS.

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**April 1st, 1903.**—The meeting was called to order at 8.40 p. m., President Noble in the chair; Chas. Warren Hunt, Secretary, and present, also, 119 members and 25 guests.

The minutes of the meetings of March 4th and 18th, 1903, were approved as printed in *Proceedings* for March, 1903.

A paper entitled "The Filtration Works of the East Jersey Water Company, at Little Falls, New Jersey," by George W. Fuller, Assoc. M. Am. Soc. C. E., was presented by the author and illustrated with lantern slides. The paper was discussed by Messrs. Allen Hazen, J. P. A. Maignen, Rudolph Hering, C. L. Harrison, J. Waldo Smith, R. S. Weston, George C. Whipple, William B. Fuller, L. L. Tribus and the author.

A paper entitled "Automatic Modules for Regulating the Speed of Filtration," by Charles Anthony, Jr., M. Am. Soc. C. E., was presented by title. On this paper there was no discussion.

Ballots for membership were canvassed, and the following candidates elected:

AS MEMBERS.

BAXTER LAMONT BROWN, St. Louis, Mo.  
ALBERT HARLOW DAKIN, Jr., New York City.  
CHARLES MORTON EMMONS, Beaver Falls, Pa.  
FRED EUGENE FOSS, State College, Pa.  
OWEN BERT FRENCH, Washington, D. C.  
MORRIS KNOWLES, Pittsburg, Pa.  
CARL GUSTAF EMIL LARSSON, Pencoed, Pa.  
SAMUEL PHILLIPS MITCHELL, Philadelphia, Pa.  
HENRY TEGMEYER PORTER, Greenville, Pa.  
CHARLES LEWIS POTTER, Memphis, Tenn.  
HENRY ROHWER, St. Louis, Mo.  
HENRY BEDINGER RUST, Pueblo, Colo.  
CLIFFORD STANLEY SIMS, New York City.  
LEONARD CHASE WASON, Brookline, Mass.  
ROBERT PATTERSON WOODS, Indianapolis, Ind.

AS ASSOCIATE MEMBERS.

WILLIAM HOYT BALCH, Washington, D. C.  
EDWARD JOSEPH CARNEY, New York City.  
ALLAN WADSWORTH CARPENTER, Jersey Shore, Pa.  
CHARLES CORWIN CREW, Versailles, Mo.  
JAMES LAIRD DE VOU, Philadelphia, Pa.  
BENJAMIN FRANKLIN, Philadelphia, Pa.  
MORGAN DODGE HAYES, Pittsburg, Pa.  
WILLIAM HALE KIMBALL, Davenport, Iowa.  
FRANCIS MASON, New York City.  
SERGIUS PAVLOVITCH MAXIMOFF, St. Petersburg, Russia.  
GEORGE SOTER MILLER, Fishers Island, N. Y.  
JAMES ADOLPHUS OMBERG, Jr., Memphis, Tenn.  
CLIFFORD MOSES PRITCHARD, Leavenworth, Kans.  
JOHN CORNELIOUS SESSER, Kansas City, Mo.  
MARSHALL NEY SHOEMAKER, Philadelphia, Pa.  
JAMES WILLIAM SKELLY, St. Louis, Mo.

The Secretary announced the election of the following candidates by the Board of Direction on March 31st, 1903:

AS JUNIORS.

MARK ANTHONY BELTAIRE, Jr., New York City.  
EDWIN MERRITT HOLMES, Daiquiri, Cuba.  
AUGUSTUS KEMPKEY, Jr., Oakland, Cal.  
JAMES HENRY MINER, Fort Dodge, Iowa.

EGBERT JESSUP MOORE, Phoenixville, Pa.  
 GEORGE TILLEY SEABURY, New York City.  
 JAMES HAMPDEN SMALL, JR., New York City.  
 HERBERT JOSEPH WILD, Portland, Me.

The Secretary announced the following deaths:

CHARLES ANDREWS KNOWLTON, elected Member October 2d, 1901; died March 2d, 1903.

ROBERT BLUM OLNEY, elected Junior January 3d, 1895; Associate Member September 5th, 1900; died March 19th, 1903.

WILLIAM JOHNSTON TAYLOR, elected Fellow May 10th, 1870; died March 25th, 1903.

Adjourned.

**April 15th, 1903.**—The meeting was called to order at 8.45 P. M.. President Noble in the chair; Chas. Warren Hunt, Secretary, and present also, 54 members and 8 visitors.

A paper entitled "An Investigation of the Properties of Brick Under Different Physical Conditions," by S. M. Turrill, Assoc. Am. Soc. C. E., was presented by the Secretary, who also read a communication on the subject from E. J. McCaustland, Assoc. M. Am. Soc. C. E.

The Secretary announced the death of WILLIAM WARREN CARD, elected Member September 5th, 1883; died April 4th, 1903.

Adjourned.

## OF THE BOARD OF DIRECTION.

(Abstract.)

**March 31st, 1903.**—8.40 P. M.—President Noble in the chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Briggs, Craven, Croes, Davison, Knap, Kuichling, Pegram, Osgood, and Schneider.

The following resolution was passed:

“That in the future in any year the Collingwood Prize for Juniors is not awarded, a sum equal to the value of the Prize be appropriated for the purchase of books, photographs, or exhibits of American Engineering Works; such exhibits to be inscribed in a manner indicating their source; and that it be made the duty of the Library Committee to expend such funds.”

The following gentlemen were added to the Local Committee of Arrangements for the Convention already announced:

J. C. GUILD, Chattanooga, Tenn.

GEORGE O. TENNEY, Spartanburg, S. C.

W. A. LELAND, Columbia, S. C.

NESBIT WINGFIELD, Augusta, Ga.

J. N. HAZLEHURST, Mobile, Ala.

The following resignations were accepted: Archibald Alexander Schenck, M. Am. Soc. C. E.; Walter Bruce Gormly, Jun. Am. Soc. C. E.

Applications were considered and other routine business transacted. Eight candidates for admission as Junior were elected.\*

Adjourned.

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\* See page 128.

## ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

## MEETINGS.

**Wednesday, May 6th, 1903.**—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and two papers will be presented for discussion, as follows: "A Small Rock-Fill Dam," by H. deB. Parsons, M. Am. Soc. C. E.; and "Deflection of Beams with Variable Moments of Inertia," by C. W. Hudson, M. Am. Soc. C. E. These papers were printed in *Proceedings* for March, 1903.

**Wednesday, May 20th, 1903.**—8.30 P. M.—At this meeting a paper, by D. M. Andrews, M. Am. Soc. C. E., entitled "The Economic Improvement of the Coosa and Alabama Rivers, in Georgia and Alabama," will be presented for discussion. This paper is printed in this number of *Proceedings*.

## SEARCHES IN THE LIBRARY.

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many such searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction to the members who have made use of the resources of the Society in this manner has been expressed frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling compared to the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

Copies of all lists of references are filed, so that in many cases it is only necessary to make a typewritten copy, which reduces the cost of searches for members to a minimum.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.



**ANNUAL CONVENTION OF 1903.**

The Thirty-fifth Annual Convention will be held at Asheville, N. C., June 9th, 10th, 11th and 12th, 1903.

A circular will soon be issued giving information as to arrangements, which are in the hands of the following Committees:

**COMMITTEE OF THE BOARD OF DIRECTION.**

J. JAMES R. CROES, *Chairman.*

GEORGE H. PEGRAM,

CHAS. WARREN HUNT.

**LOCAL COMMITTEE.**

J. L. LUDLOW, *Chairman.*

WILLIAM CAIN,

J. IMBRIE MILLER,

WILBUR F. FOSTER,

WILLIAM MONCURE,

GEORGE W. FRANK,

J. A. MONTGOMERY,

J. C. GUILD,

E. T. D. MYERS,

J. N. HAZLEHURST,

ARTHUR PEW,

W. B. W. HOWE,

GEORGE O. TENNEY,

W. A. LELAND,

NESBIT WINGFIELD.

**TOPICS FOR INFORMAL DISCUSSION.**

**Topic No. 1.** Timber Tests. (See statement in detail as to this subject, on page 133.)

**Topic No. 2.** Sewage Purification. (This subject will be presented by Rudolph Hering, M. Am. Soc. C. E.)

**Topic No. 3.** In the treatment of the Mississippi River, is the Levee Theory justified by Experience?

**Topic No. 4.** Is it possible to make Concrete which will be Impervious to Water? If so, what is the best method?

**Topic No. 5.** What is the effect of Sea-Water upon Steel, and upon Steel and Concrete used in Combination, and is the use of Steel in Sea-Water admissible?

**Topic No. 6.** In view of the increasing weights of Rolling Stock, for what loadings should Railroad Bridges be designed?

Discussion on each of these subjects is invited. Communications from members who are unable to attend the Convention will be presented by the Secretary.

### TIMBER TESTS.

This subject will be introduced for discussion at the Annual Convention by Gifford Pinchot, Assoc. Am. Soc. C. E., of the Bureau of Forestry, of the U. S. Department of Agriculture, who has prepared the following statement:

The Bureau of Forestry, of the United States Department of Agriculture, intends to resume the work of testing timber formerly carried on by the Division of Forestry during the years 1891-1896. A large portion of the groundwork covered by the proposed investigation is of interest to engineers, and it is the desire of the Bureau that the results obtained shall be of the greatest value to them. To this end it is hoped that those engineers interested in the application of timber to construction, will, in this discussion, offer suggestions and make criticisms which will aid the Bureau in planning this series of tests.

It is the intention of the Bureau to take up these tests in a thorough manner and devote whatever time may be necessary for the solution of the problems involved. It is expected that the plan of operation will be sufficiently complete, and the methods of tests so well chosen, that the data obtained may be accepted by all experts.

The following account of the proposed tests is of a very general nature. Those who are particularly interested can obtain a description of the proposed tests in greater detail on application to the Bureau of Forestry, Washington, D. C.

The Bureau aims at results of practical value, such as the values expressing the strength and stiffness of the principal merchantable species of timber of this country. Not only will this be done for timber now in use, but efforts will be directed to ascertaining the value for structural purposes of timbers at present not largely used, as, for example, the Western Hemlock and the Southern Gums. A thorough series of tests will be made of the timbers of the Pacific Slope, particularly the Red Fir, otherwise called Oregon Pine or Douglas Spruce, which is now finding its way in increasing quantities to eastern markets. If it should appear that the work done on the Southern Pines by the Division of Forestry during the years 1891-1896 has been sufficiently complete, the proposed tests will not cover these timbers.

Experimentation will be directed also in advance to the investigation of the effects of different factors of the testing processes on the results, such as speed of application of a load, method of moisture determination, the effect of moisture, and of volatile oils.

The investigation of the effect of technological operations, such as methods of kiln drying, methods of preserving timber, etc., will be undertaken.

In determining the values of the strength and stiffness of various merchantable timbers, tests will be made, both on timber collected from the market and on timber collected in the forest. Full-sized sticks, as

used in construction, will in all cases be tested under their appropriate loadings.

Work is at present in progress at a station in California, on the different merchantable grades of these full-sized timbers, such as bridge stringers and car sills collected on the market. The locality of origin of the timbers is determined, and a full description of each stick, as well as a series of photographs of all six sides, is made a matter of record. Full information of the physical and mechanical properties of the sticks under test will be obtained.

The investigation of the effect of various conditions of forest growth on the physical and mechanical properties of timber will be undertaken whenever the Bureau is thoroughly prepared for this work.

It is hoped that the discussion will take up the need of making timber tests from the standpoint of the engineer. Suggestions are invited as to those particular matters which at present most need investigation. It is also desired that discussion shall take place concerning the methods of performing the tests, particularly as to the best method of determining the moisture in timber; and the best method of determining the shearing strength of timber.

It is hoped that a full criticism of the former tests, both as to methods and content, will be given.

It is recognized that timber is subject to a great number of variables. From the botanical standpoint, the ideal method of procedure would be to determine the properties of the wood fiber of each species representing the normal growth of straight-grained timber. With these standard values as a basis, inquiries could be directed to ascertain how much the values are affected by such variables as moisture, oil, speed of test, imperfection of structure due to direction of grain or knots, rate of growth, diseases of the tree, technological processes such as kiln drying or preserving, etc.; forest conditions, region, and growth. It would seem that the interests of all, whether engineers, manufacturers, or botanists, would be consulted by such a method of procedure. The particular series of tests on full-sized sticks of market timber would form part of this general scheme.

## ACCESSIONS TO THE LIBRARY.

From March 11th to April 7th, 1903.

## DONATIONS.\*

## STORAGE BATTERY ENGINEERING.

A Practical Treatise for Engineers. By Lamar Lyndon, Assoc. M. Am. Inst. E. E. Cloth,  $9\frac{1}{2} \times 6\frac{1}{2}$  ins., 382 pp., illus. New York, McGraw Publishing Company, 1903. \$3.00.

This book is intended to assist the practicing engineer in designing, installing and maintaining battery equipments, and to guide him in the selection of types of batteries and auxiliary apparatus best suited to the service which they are to perform, and at the same time impress upon the technical public, both the advantages and limitations of the storage battery in practice. Mathematics have been avoided as far as possible. The Osmotic and Thermodynamic theories of the storage battery have not been discussed, as their comprehension requires more electro-chemical knowledge than the majority of electrical engineers possess, and this work is intended to be a practical engineers' manual. The chapter headings are: General Theory of the Storage Battery; General Requirements; On Voltage and its Variation; On Quantity and Distribution of Active Material; On Electrolyte; On Quantity of Electrolyte; On Internal Discharge; On the Influence of Temperature; On Capacity Variation; On Internal Resistance; On Efficiency; On the Durability and Causes of Deterioration; On Diseases and their Remedies; On Care and Management; Types of Planté Plates; Methods of Planté Formation; Faure System; Applied Active Material Mixtures; Envelopes and Separators; Containing Cells; Assembling and Installing; Testing; Miscellaneous Data. There is an index of five pages.

## SPECIFICATIONS FOR ELECTRIC RAILWAY BRIDGES. 1902.

By C. S. Davis. Paper,  $9 \times 6$  ins.,  $8 + 48$  pp. Toledo, C. S. Davis, 1902. 50 cents.

In these specifications an equivalent load has been used by the author for the reason that the wheel base and wheel loads for electric railway cars vary to such an extent that it seems a useless task to use a different wheel load and wheel base for every line. The equivalent load used is the same for any span length, and gives results reasonably close for any wheel base that is now being used. There are nine general divisions, as follows: General Description; Loads; Unit Stresses; Details of Design; Shop Work; Field Work; Quality of Material; Inspection; Maintenance.

## HEATING AND VENTILATING BUILDINGS.

A Manual for Engineers and Architects. By Rolla C. Carpenter, M. Am. Soc. M. E. Fourth Edition, Revised and Enlarged. Cloth,  $9 \times 6$  ins.,  $16 + 562$  pp., illus. New York, John Wiley & Sons, 1903. \$4.00.

The present edition of this work has been very largely re-written and considerable new matter added, the size of the book, as compared with the first edition, being increased by nearly one-third. Three new chapters have been added: One relating to the fan or blower for moving air, another to the general subject of mechanical systems of heating and ventilating, and a third to schoolhouse heating and ventilation. It is believed that the book in its present form describes the latest improvements in the art of heating and ventilating. It also gives directions for the construction and installation of all the various systems of heating and ventilating now in use. The Contents are: Nature and Properties of Heat; Principles of Ventilation; Amount of Heat Required for Warming; Heat Given off from Radiating Surfaces; Pipe and Fittings Used in Steam and Hot-Water Heating; Radiators and Heating Surfaces; Steam-Heating Boilers and Hot-Water Heaters; Settings and Appliances; Methods of Operating; Various Systems of Piping; Design of Steam and Hot-Water Systems; Heating with Exhaust Steam; Non-Gravity Return Systems; Heating with Hot Air; Mechanical Ventilators; Mechanical Systems of Heating and Ventilating; Heating with Electricity; Temperature Regulators; Schoolhouse Warming and Ventilation; Specification Proposals and Business Suggestions; Appendix. There is an index of twenty pages.

\* Unless otherwise specified, books in this list have been donated by the Publishers.



**DISINFECTION AND DISINFECTANTS.**

A Practical Guide for Sanitarians, Health and Quarantine Officers. By M. J. Rosenau. Cloth, 8 x 6 ins., 353 pp., illus. Philadelphia, P. Blakiston's Son & Co., 1902. \$2.00.

The preface states that this book has been written with the hope that it may help others who have to battle with the infection of the communicable diseases. The author has tried to set down the results of his experience gained in sanitary work of a public-health character, both in the field and in the laboratory. It has been his aim to state the important facts in a form to be of practical use to the disinfecter. The subject has been considered from the standpoint of the disinfectant used, the object to be disinfected, and the disease for which the disinfection is done. In considering any subject from three points of view a certain amount of repetition is unavoidable. The chapter headings are: Introduction; Physical Agents; Gaseous Disinfectants; Chemical Solutions; Insecticides Applied to Disinfection Against the Insect-Borne Diseases; Disinfection of Houses, Ships and Objects; Disinfection for the Communicable Diseases. There is an index of seven pages.

**THE ELECTRIC TELEPHONE.**

By Edwin J. Houston and A. E. Kennelly. Second Edition, Enlarged. Cloth, 7 x 5 ins., 6 + 453 pp., illus. New York, Electrical World and Engineer, copyright 1902. \$1.00. (Presented by the McGraw Publishing Co.)

The authors have prepared this little book on the telephone, in the hope of enabling those who are not trained in electro-technics to understand the main principles and method of operation of the telephone systems of to-day. Since the first edition much growth and development have taken place in telephonic engineering and practice. The authors have added three new chapters upon recent subjects of importance, and believe, that by so doing, the book will be brought up to date. The chapter headings are: Introductory; Elementary Acoustic Principles; The Telephone Receiver; The Microphone Transmitter; The Induction Coil; Call Bells and Batteries; Single-Circuit Connections; Multiple-Circuit Connections; Isolated-Station Switchboards; Multiple Switchboards; Telephonic Circuits; Long-Distance Telephony; Radiophony and Miscellaneous Applications of Electricity; Common-Battery Systems; Visual Signals; Loaded Telephone Circuits. There is an index of twenty-seven pages.

**THE ART OF ILLUMINATION.**

By Louis Bell. Cloth, 9 x 6 ins., 339 pp., illus. New York, McGraw Publishing Co., 1902. \$2.50.

The author states in the preface that this volume is a study of the utilization of artificial light. It is intended to deal, not with the problem of distributing illuminants, but with their application, and treats of the illuminants themselves only in so far as a knowledge of their peculiarities is necessary to their intelligent use. To compress the subject within reasonable bounds, it has been necessary to discuss general principles rather than concrete examples of artificial lighting. The Contents are: Light and the Eye; Principles of Color; Reflection and Diffusion; The Materials of Illumination—Illuminants of Combustion; The Materials of Illumination—Incandescent Burners; The Electric Incandescent Lamp; The Electric Arc Lamp; Shades and Reflectors; Domestic Illumination; Lighting Large Interiors; Street and Exterior Illumination; Decorative and Scenic Illumination; The Illumination of the Future; Standards of Light and Photometry. There is an index of five pages.

**RAILROAD CONSTRUCTION, THEORY AND PRACTICE.**

A Text-Book for the Use of Students in Colleges and Technical Schools. By Walter Loring Webb, Assoc. M. Am. Soc. C. E. Second Edition, Revised and Enlarged. Morocco, 7 x 4 ins., 17 + 675 pp., illus. New York, John Wiley & Sons, 1903. \$5.00.

The preface states that the inconvenience of the octavo edition for field-work was found to be limiting the use of the book. It was therefore decided to recast the whole work and reduce the page from "octavo" to "pocket-book" size. Advantage was then taken of the opportunity to revise freely and to add new matter. The author's primary aim has been to produce a text-book for students, the subject-matter has therefore been cut down to that which may properly be required of students in the time usually allotted to railroad work in a civil-engineering curriculum. On this account no extended discussion has been given to the multitudinous forms of various



railroad devices in the chapters on structures. The aim has been to teach the principles and to guide the students into proper methods of investigation. The Contents are: Railroad Surveys; Alignment; Earthwork; Trestles; Tunnels; Culverts and Minor Bridges; Ballast; Ties and Other Forms of Rail Support; Rails; Rail-Fastenings; Switches and Crossings; Miscellaneous Structures and Buildings; Yards and Terminals; Block Signaling; Rolling Stock; Train Resistance; Cost of Railroads; The Promotion of Railroad Projects; Operating Expenses; Distance; Curvature; Grade; Improvement of Old Lines; Adjustments of Instruments. There is an index of twenty-three pages.

#### BLACKWELL'S ISLAND BRIDGE IN THE CITY OF NEW YORK.

By Gustav Lindenthal. Paper, 24 x 15 ins., 6 plates. New York, 1903. 60 cents. (Donated by the author.)

#### SELF-PROPELLED VEHICLES.

A Practical Treatise on the Theory, Construction, Operation, Care and Management of All Forms of Automobiles. By James E. Homans. Cloth, 9 x 6 ins., 6 + 626 pp., illus. New York, Theo. Audel & Company, 1902. \$2.00.

The preface states that the treatment of subjects throughout this work has been kept as nearly as possible in the lines popularly called "non-technical," and the various theories and problems involved in the construction and operation of the prevailing types of motor road carriages have been stated as clearly and simply as possible, in order that the involved situations may be readily comprehended by all readers. The fundamental principles of the several types of motor, particularly of the gasoline engine, have been treated at considerable length, in order that the facts may be comprehended in their new relations. It has been the author's aim to state and discuss the most important points of this already immense subject, and to treat only of constructions that have been proven thoroughly practical. There is an index of six pages.

#### A PHILOSOPHICAL ESSAY ON PROBABILITIES.

By Pierre Simon, Marquis de Laplace. Translated from the Sixth French Edition by Frederick Wilson Truscott and Frederick Lincoln Emory, M. Am. Soc. M. E. Cloth, 8 x 5 ins., 4 + 196 pp. New York, John Wiley & Sons, 1902. \$2.00.

This essay is the development of a lecture on probabilities which the author delivered in 1795 to the normal schools whither he had been called, by a decree of the national convention, as professor of mathematics, with Lagrange. The author presents here, without the aid of analysis, the principles and general results of the theory of probabilities, applying them to the most important questions of life.

#### Gifts have also been received from the following:

- |  |  |
|--|--|
| Am. Inst. of Min. Engrs. 17 pam.                                 | Columbus, Ohio—Water-Works Dept. 1 pam.              |
| Assoc. Parisienne des Propriétaires d'Appareils à Vapeur. 1 vol. | Cumberland Valley R. R. Co. 1 pam.                   |
| Binghamton, N. Y.—City Engr. 1 pam.                              | Currier, C. G. 7 pam.                                |
| Bond, Edward A. 2 pam.   | Delaware & Hudson Co. 1 pam.                         |
| Boston, Mass.—City Auditor. 5 bound vol.                         | Eng. Assoc. of the South. 1 pam.                     |
| Boston, Mass.—Fire Dept. 8 bound vol., 19 pam.                   | Eng. News Pub. Co. 138 bound vol., 96 vol., 311 pam. |
| Boston, Mass.—Street Dept. 7 bound vol.                          | Eng. Standards Committee. 1 pam.                     |
| Boscaren, G. 1 bound vol.  | Ford, Frederick L. 1 pam.                            |
| Brandon, Vt.—Town Officers. 7 pam.                               | Furber, William Copeland. 1 pam.                     |
| Brooklyn, N. Y.—Commr. of Pub. Works. 2 pam.                     | Glasgow & South-Western Ry. Co. 1 pam.               |
| Buck, Henry R. 1 bound vol., 18 pam.                             | Gloucester, Mass.—Water Commrs. 6 pam.               |
| Burlington, Vt.—City Clerk. 22 vol.                              | Grand Rapids & Indiana Ry. Co. 1 pam.                |
| Burlington, Vt.—Water Dept. 1 pam.                               | Great Britain—Patent Office. 2 vol., 2 pam.          |
| Cairns, Robert A. 1 pam.   | Green Bay & Western R. R. Co. 2 pam.                 |
| Cambridge, Mass.—City Clerk. 6 bound vol., 1 vol.                | Griggs, Julian. 1 vol., 6 pam.                       |
| Canada—Chf. Engr. of Rys. and Canals. 1 vol., 3 pam.             | Hunt, Chas. Warren. 2 pam.                           |
| Canada—Tidal Survey. 4 pam.                                      | Inst. of Civ. Engrs. of Ireland. 6 vol.              |
| Chicago. St. Paul, Minneapolis & Omaha Ry. Co. 1 pam.            | Jackson, G. W. 1 pam.                                |
| Colo.—Agri. Exper. Station. 8 pam.                               | Jenkins, Wm. Dunbar. 1 pam.                          |
| Colo.—State Engr. 1 vol.   | Lansing, E. Ten Eyck. 1 pam.                         |
|  | Lawrence, Mass.—Water Board. 1 pam.                  |
|  | Lib. of Cong. 1 pam.                                 |
|  | Manchester Steam Users' Assoc. 1 pam.                |

- Mass.—Metropolitan Park Comm. 1 bound vol.  
 Merchants' Assoc. of New York. 1 vol.  
 Missouri Pacific Ry. Co. 1 pam.  
 N. J.—State Geologist. 1 bound vol.  
 N. Y.—R. R. Comms. 2 bound vol.  
 N. Y. Univ. 1 pam.  
 Northern Central Ry. Co. 1 pam.  
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**Die Gleichstrommaschine, Theorie, Konstruktion, Berechnung, Untersuchung und Arbeitsweise derselben.** Von E. Arnold. Vol. I. Berlin, Julius Springer, 1902.

**Hydraulic Power and Hydraulic Machinery.** By Henry Robinson, M. Inst. C. E., M. I. M. E. Second Edition, Revised and Enlarged. London, Charles Griffin and Company, Limited, 1893.

**The Balancing of Engines.** By W. E. Dalby, M. Inst. C. E., M. I. M. E. New York, Longmans, Green and Co.; London, Edward Arnold, 1902.

**The Steam Turbine.** By Robert M. Neilson, Assoc. M. I. M. E. Longmans, Green and Co., London, New York and Bombay, 1902.

**The Thermodynamics of Heat-Engines.** By Sidney A. Reeve. New York, The Macmillan Company; London, Macmillan & Co., Ltd., 1903.

**Die Geschichte des Eisens in technischer und kulturgeschichtlicher Beziehung.** Von Dr. Ludwig Beck. Vol. V, Pt. 8. Braunschweig, Friedrich Vieweg, 1903.

**Rand, McNally & Co.'s Indexed Atlas of the World.** Historical-Descriptive-Statistical. 2 vol. Rand, McNally & Company, Chicago, New York, London, Berlin, copyright 1902.

**The New Volumes of the Encyclopædia Britannica**, constituting, in combination with the existing Volumes of the Ninth Edition, the Tenth Edition of that Work, and also Supplying a New, Distinctive, and Independent Library of Reference Dealing with Recent Events and Developments. Vols. I to VII, Forming Vols. XXV to XXXI of the Complete Work. Adam and Charles Black, London and Edinburgh, The Encyclopædia Britannica Company, New York, 1902.

**Controle des Chemin de Fer et des Tramways.** Par Jean de la Ruelle. Paris, Vve. Ch. Dunod, 1903.

**The Trans-Siberian Route; or, Notes of a Journey from Peking to New York in 1902.** By Clarence Cary. New York, The Evening Post Job Printing House, 1902.

**Tracé et Terrassements.** Tracé par P. Frick; Terrassements par J. L. Canaud. Paris, Vve. Ch. Dunod, 1903.

**Calcareous Cements:** Their Nature and Uses, with some Observations upon Cement Testing. By Gilbert R. Redgrave. Assoc. Inst. C. E. London, Charles Griffin and Company, Limited, 1895.

**Slow Burning or Mill Construction.** Report No. V of the Insurance Engineering Experiment Station. Boston, 1902.

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#### SUMMARY OF ACCESSIONS.

From March 11th to April 7th, 1903.

Donations (including 355 duplicates).....	886
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Total.....	906

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GORMLY, WALTER BRUCE... ..March 1st, 1903

## DEATHS.

KNOWLTON, CHARLES ANDREWS.....Elected Member, October 2d, 1901;  
died March 2d, 1903.OLNEY, ROBERT BLUM.....Elected Junior, January 3d, 1895;  
Associate Member, September 5th,  
1900; died March 4th, 1903.TAYLOR, WILLIAM JOHNSTON.....Elected Fellow, May 10th, 1870; died  
Feb. 17th, 1903.

## MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(March 11th to April 7th, 1903.)

NOTE.-- This list is published for the purpose of placing before the members of the Society the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.

### LIST OF PUBLICATIONS.

In the subjoined list of articles references are given by the number prefixed to each journal in this list.

- (1) *Journal, Assoc. Eng. Soc.*, 257 South Fourth St., Philadelphia, Pa., 30c.
- (2) *Proceedings, Eng. Club of Phila.*, 1122 Girard St., Philadelphia, Pa.
- (3) *Journal, Franklin Inst.*, Philadelphia, Pa., 50c.
- (4) *Journal, Western Soc. of Engrs.*, Monadnock Block, Chicago, Ill.
- (5) *Transactions, Can. Soc. C. E.*, Montreal, Que., Canada.
- (6) *School of Mines Quarterly*, Columbia Univ., New York City, 50c.
- (7) *Technology Quarterly*, Mass. Inst. Tech., Boston, Mass., 75c.
- (8) *Stevens Institute Indicator*, Stevens Inst., Hoboken, N. J., 50c.
- (9) *Engineering Magazine*, New York City, 25c.
- (10) *Cassier's Magazine*, New York City, 25c.
- (11) *Engineering* (London), W. H. Wiley, New York City, 25c.
- (12) *The Engineer* (London), International News Co., New York City, 35c.
- (13) *Engineering News*, New York City, 15c.
- (14) *The Engineering Record*, New York City, 12c.
- (15) *Railroad Gazette*, New York City, 10c.
- (16) *Engineering and Mining Journal*, New York City, 15c.
- (17) *Street Railway Journal*, New York City, 35c.
- (18) *Railway and Engineering Review*, Chicago, Ill., 10c.
- (19) *Scientific American Supplement*, New York City, 10c.
- (20) *Iron Age*, New York City, 10c.
- (21) *Railway Engineer*, London, England, 25c.
- (22) *Iron and Coal Trades Review*, London, England, 25c.
- (23) *Bulletin, American Iron and Steel Assoc.*, Philadelphia, Pa.
- (24) *American Gas Light Journal*, New York City, 10c.
- (25) *American Engineer*, New York City, 20c.
- (26) *Electrical Review*, London, England.
- (27) *Electrical World and Engineer*, New York City, 10c.
- (28) *Journal, New England Water Works Assoc.*, Boston, \$1.
- (29) *Journal, Society of Arts*, London, England, 15c.
- (30) *Annales des Travaux Publics de Belgique*, Brussels, Belgium.
- (31) *Annales de l'Assoc. des Ing. Sortis des École Spéciales de Gand*, Brussels, Belgium.
- (32) *Mémoires et Compte Rendu des Travaux*, Soc. Ing. Civ. de France, Paris, France.
- (33) *Le Génie Civil*, Paris, France.
- (34) *Portefeuille Économique des Machines*, Paris, France.
- (35) *Nouvelles Annales de la Construction*, Paris, France.
- (36) *La Revue Technique*, Paris, France.
- (37) *Revue de Mécanique*, Paris, France.
- (38) *Revue Générale des Chemins de Fer et des Tramways*, Paris, France.
- (39) *Railway Master Mechanic*, Chicago, Ill., 10c.
- (40) *Railway Age*, Chicago, Ill., 10c.
- (41) *Modern Machinery*, Chicago, Ill., 10c.
- (42) *Transactions, Am. Inst. Elec. Engrs.*, New York City, 50c.
- (43) *Annales des Ponts et Chaussées*, Paris, France.
- (44) *Journal, Military Service Institution*, Governor's Island, New York Harbor, 50c.
- (45) *Mines and Minerals*, Scranton, Pa., 20c.
- (46) *Scientific American*, New York City, 8c.
- (47) *Mechanical Engineer*, Manchester, England.
- (54) *Transactions, Am. Soc. C. E.*, New York City, \$5.
- (55) *Transactions, Am. Soc. M. E.*, New York City, \$10.
- (56) *Transactions, Am. Inst. Min. Engrs.*, New York City, \$5.
- (57) *Colliery Guardian*, London, England.
- (58) *Proceedings, Eng. Soc. W. Pa.*, 410 Penn Ave., Pittsburg, Pa., 50c.
- (59) *Transactions, Mining Inst. of Scotland*, London and Newcastle-upon-Tyne.
- (60) *Municipal Engineering*, Indianapolis, Ind., 25c.
- (61) *Proceedings, Western Railway Club*, 225 Dearborn St., Chicago, Ill., 25c.
- (62) *American Manufacturer and Iron World*, 59 Ninth St., Pittsburg, Pa.
- (63) *Minutes of Proceedings, Inst. C. E.*, London, England.
- (64) *Power*, New York City, 20c.
- (65) *Official Proceedings, New York Railroad Club*, Brooklyn, N. Y., 15c.
- (66) *Journal of Gas Lighting*, London, England, 15c.
- (67) *Cement and Engineering News*, Chicago, Ill., 25c.
- (68) *Mining Journal*, London, England.

## LIST OF ARTICLES.

**Bridge.**

- Electric Railway Bridges. Wilbur J. Watson. (1) Jan.  
 A Comparison Between Eye-Bar Chains and Wire Cables for Suspension Bridges. Wilhelm Hildenbrand. M. Am. Soc. C. E. (13) Mar. 12.  
 Report of Special Commission of Engineers on the Plans for the Manhattan Bridge, New York City. (13) Mar. 12; (14) Mar. 21.  
 A Railway Trestle with Bents of Reinforced Concrete.\* Wm. A. Allen, Assoc. M. Am. Soc. C. E. (13) Mar. 12.  
 The Erection of the Miramichi Bridge.\* (14) Mar. 14.  
 Arch Bridge Construction on the C., M. & St. P. Ry.\* (18) Mar. 14.  
 Completion of the Floor of the New East River Bridge.\* (46) Mar. 14.  
 A Novel Plan for Removing a Bridge.\* (40) Mar. 20.  
 The Chicago Great Western and the Fort Dodge Bridge.\* (40) Mar. 20.  
 The Delaware River Bridge of the Pennsylvania Railroad at Trenton, N. J.\* (40) Mar. 20.  
 A Conventional System of Treating Wheel Loads. M. F. Brown, Assoc. M. Am. Soc. C. E. (13) Mar. 26.  
 Stone Arch Bridge on the Chicago, Milwaukee & St. Paul Ry. at Watertown, Wis.\* (13) Mar. 26.  
 The Manhattan Valley Viaduct of the New York Rapid Transit Railroad.\* (14) Mar. 28.  
 Le Viaduc de Kinzua (Etats-Unis).\* A. Morizot. (35) Mar.

**Electrical.**

- Electric Shop Drive: Discussion.\* W. A. Layman, W. Cooper, Ferdinand Schwedtmann. (1) Jan.  
 Some Interesting Experiences Connected with the Manipulation and Installation of Cables. H. W. Fisher. (58) Jan.  
 The Evolution of the Telephone Switchboard. Thomas D. Lockwood. (42) Feb.  
 An Automatic Telephone Operator. William J. Hammer. (42) Feb.  
 Electrically Driven Shops. (65) Feb.  
 The Largest Power Plant in New Hampshire (Amoskeag Mfg. Co.).\* (27) Feb. 28.  
 Some Engineering Features of the Bedell System of Composite Transmission.\* A. S. McAllister. (27) Feb. 28.  
 Radiant Efficiency of the Mercury Arc. (27) Feb. 28.  
 Analysis of the Seventh Annual Report of the Public Lighting Commission, Detroit, Mich. (27) Feb. 28.  
 A Study of the Phenomenon of Resonance in Electric Circuits by the Aid of Oscillograms. M. B. Field. (Abstract of paper read before the Glasgow Section, Inst. Elec. Engrs.) (26) Serial beginning Mar. 6.  
 The Joint Transmission of Differing Currents. Frederick Bedell. (Abstract of paper read before the Elec. Soc. of Cornell Univ.) (26) Mar. 6.  
 The Electric Lighting of Eastbourne.\* (26) Mar. 13.  
 Some Notes on Continental Power House Equipment. H. L. Riseley, A. M. I. E. E. (Abstract of paper read before the Newcastle Local Section, Inst. Elec. Engrs.) (26) Mar. 13.  
 The 22000-Volt Transmission Installation of the Northern California Power Company.\* (27) Mar. 14.  
 Electricity as a Motive Power in Mechanical Flight.\* T. Byard Collins. (27) Mar. 14.  
 The Heyland Induction Motor. Boy de la Tour. (27) Serial beginning Mar. 14.  
 High Temperature Electro-Chemistry: Notes on Experimental and Technical Electric Furnaces.\* R. S. Hutton, A. I. E. E., and J. E. Petavel, A. M. I. E. E. (Paper read before the Inst. of Elec. Engrs.) (10) Serial beginning Mar. 14.  
 Kircaldy Electricity Works.\* (26) Mar. 20.  
 Test of the National Telegraph.\* (18) Mar. 21.  
 Bull's Selective System of Wireless Telegraphy.\* A. Frederick Collins. (46) Mar. 21.  
 The Testing of Recording Wattmeters on the Consumer's Premises by Means of a Specially Constructed Portable Test Meter. W. J. Mowbray. (27) Mar. 21.  
 A Notable Invention in Rapid Telegraphy. Romyn Hitchcock. (27) Mar. 21.  
 Formal Opening of the Frontier Independent Telephone Exchange, Buffalo, N. Y.\* Frank C. Perkins. (27) Mar. 21.  
 Electric Ignition in Gas Engines. Sir David Salomons, Bart. (26) Serial beginning Mar. 27.  
 The Principles of a New Method of Electric Lighting. Paul Hoho. (27) Mar. 28.  
 The Induction Coil. James Edmund Ives. (27) Mar. 28.  
 The Development and Use of the Small Electric Motor.\* Fred. M. Kimball. (9) Apr.  
 Alternating Current for Light and Power. Chas. F. Scott, Pres. Am. Inst. E. E. (10) Apr.  
 Electrical Developments in Russia.\* Thomas E. Heenan. (10) Apr.  
 Power Test of an Electrically-Driven Shaper.\* (25) Apr.  
 Motor-Driven Machine Tools.\* (25) Apr.  
 The Application of Individual Motor Drives to Old Machine Tools; McKees Rocks Shops, Pittsburgh & Lake Erie R. R.\* R. V. Wright. (25) Serial beginning Apr.  
 Fonctionnement de l'Éclairage Électrique sur les Réseaux de Traction. Maurice Soubrrier. (36) Serial beginning Feb. 25.  
 Usine Hydro-Électrique des Côtes de Sassenage (Isère).\* Maduit. (33) Mar. 7.

\* Illustrated.



**Marine.**

- Changes in the Armament of Warships. (12) Mar. 13.  
 Multitubular Marine Boilers and Their Features.\* William H. Fowler. (47) Mar. 14.  
 Some Miscellaneous Types of Marine Boilers.\* William H. Fowler. (47) Serial beginning Mar. 28.  
 A New Sighting Gear for Naval Guns and Gunnery Signaling Apparatus.\* (46) Mar. 28.

**Mechanical.**

- Abatement of the Smoke Nuisance.\* Report by Committee, Engineers' Society of Western New York. (1) Jan.  
 Notes on the Design of Riveter Yokes.\* Chester B. Albree. (58) Jan.  
 The Theory of Operation of the Gasoline Engine.\* E. C. Oliver. (1) Feb.  
 Electrically Driven Shops. (65) Feb.  
 The Largest Power Plant in New Hampshire (Amoskeag Mfg. Co.)\* (27) Feb. 28.  
 Economy in the Use of Coal for the Production of Power. Ira N. Hollis. (28) Mar.  
 Waste Heat Engines. Edward F. Miller. (28) Mar.  
 Cranes for Railroad Shops.\* G. R. Brandon. (39) Mar.  
 Standard Specifications for Cast-Iron Pipe and Special Castings.\* New England Water-Works Assoc. (28) Mar.  
 Inauguration of the New Gas-Works at Granton (Edinburgh)\* (66) Mar. 3.  
 The Coke Plant at the Smethwick Gas-Works: a Gravity Bucket Conveyor for Feeding Water-Gas Plant.\* (66) Mar. 3.  
 The Fischer Air-Gas System.\* (66) Mar. 3.  
 Calorimetry of Gaseous and Liquid Fuels. W. Garnet Wernham. (Extracts from Paper read before the Junior Inst. of Engrs.) (66) Mar. 3.  
 The Crystal Palace Motor-Car Show.\* (11) Mar. 6.  
 Indicating High-Speed Steam Engines.\* A. Marshall Arter, A. M. I. C. E. (12) Mar. 6.  
 Gas Engines with Recent Improvements.\* James Atkinson. (Paper read before the Manchester Assoc. of Engrs.) (47) Mar. 7.  
 Combined Oil-Carburetted and Blue Water-Gas Plant at Smethwick.\* (66) Mar. 10.  
 Tar Fog.\* William Everitt. (Paper read before the Manchester District Inst. of Gas Engrs.) (66) Mar. 10.  
 The Donora Plant (Union Steel Co.). (20) Mar. 12.  
 Large Stop Valves for High Pressure Steam. J. Hamilton Gibson. (62) Mar. 12.  
 The Petavel-Kingsmill Recording Pressure Gauge.\* (11) Mar. 13.  
 A New Steam Motor Car.\* (12) Mar. 13.  
 The Works of the Wellman-Seaver-Morgan Engineering Company.\* (22) Mar. 13.  
 Central Station Gas Engines.\* C. H. Williams. (Paper read before the Wisconsin Gas Assoc.) (24) Mar. 16.  
 Hydraulic Experiments on a Plunger Pump.\* John Goodman. (Paper read before the Inst. of Mech. Engrs.) (62) Serial beginning Mar. 19.  
 A Modern Coke Oven.\* (22) Mar. 20.  
 Pneumatic Tools and Appliances.\* Ewart C. Amos. (47) Mar. 21.  
 The Industrial Utilization of Smoke.\* Emile Guarini. (19) Mar. 21.  
 The Cold Storage Plant in the Cornell Medical College.\* (14) Mar. 21.  
 A Visit to M. de Brouwer at Bruges: a New Charging Machine of Original Design.\* (66) Mar. 24.  
 A Combination Dellwik Water-Gas and Peebles Oil-Gas Plant at Cleethorpes.\* (66) Mar. 24.  
 A Method of Calculating the Range of Speed to be Obtained from a Pair of Equal Cones. Frank B. Kleinhaus. (13) Mar. 26.  
 Some Recent Tests of Mechanical Stokers. G. A. Hutchinson. (13) Mar. 26.  
 Squandering Coal. Egbert P. Watson. (20) Mar. 26.  
 The Thornycroft Steam Wagon.\* (11) Mar. 27.  
 Petroleum Incandescent Lighting.\* Arthur Kitson. (26) Mar. 27.  
 The Grinding Machine and Some Tools. H. Darbyshire. (12) Serial beginning Mar. 27.  
 The Modern Continuous Rolling Mill.\* Axel Sahlin. (22) Mar. 27.  
 Electric Ignition in Gas Engines. Sir David Salomons, Bart. (26) Serial beginning Mar. 27.  
 The United States Navy Experiments on Oil Fuel.\* (47) Mar. 28.  
 An Industrial Plant Aerial Tramway. (14) Mar. 28.  
 The Development of the Gas Distributing System of the Suburban Gas and Electric Company in Revere and Winthrop, Mass. A. B. Tenney. (24) Mar. 30.  
 Gas for Industrial Purposes. James H. Walker. (24) Mar. 30.  
 Utilizing Air Pump Exhaust. Ben Johnson. (Paper presented before the Railway Club of Mexico.) (39) Apr.  
 A New Internal Combustion Engine.\* (41) Apr.  
 The Modern Plant: Practical Directions and Suggestions Concerning Its Design and Operation in Order to Secure the Best Results.\* W. H. Wakeman. (41) Apr.  
 The Diesel Engine.\* (64) Apr.  
 Gas Engines at the Dusseldorf Exposition.\* R. Mathot. (64) Apr.  
 A Belting and Pulley Chart.\* A. G. Holman. (64) Apr.  
 Hints on the Design and Construction of Shaft Governors.\* C. B. Risley. (64) Apr.  
 Producer Gas and Gas Engines. (64) Apr.  
 The Governor.\* (64) Apr.  
 Metal Cutting with the New Tool Steels. Oberlin Smith. (9) Apr.

\* Illustrated.



**Mechanical—(Continued).**

- The Application of Individual Motor Drives to Old Machine Tools; McKees Rocks Shops, Pittsburgh & Lake Erie R. R.\* R. V. Wright. (25) Serial beginning Apr.  
 Motor Driven Machine Tools.\* (25) Apr.  
 The New Le Blond Milling Machine.\* (20) Apr. 2.  
 The Berg Boiler Feed Regulator.\* (62) Apr. 2.  
 The Rotary Kiln as an Adjunct to the Blast Furnace. A. D. Elbers. (62) Apr. 2.  
 Notes on High Pressure Distribution (Gas).\* W. A. Learned. (24) Apr. 6.  
 Les Nouveautés en Automobile.\* Miral. (36) Serial beginning Feb. 25.  
 Les Condensations Centrales.\* A. Abraham. (36) Serial beginning Feb. 25.  
 Conditions d'Établissement des Anneaux de Piston des Machines à Vapeur.\* E. Déthiollaz. (36) Mar. 10.  
 L'Alcool Industriel: Éclairage par Incandescence.\* (36) Mar. 25.

**Metallurgical.**

- A Study of the Relations between the Microstructure, the Heat Treatment, and the Physical Properties of Axle Steel.\* Henry Fay, A. W. Higgins, and F. W. Coburn. (7) Mar.  
 The Use of High Sulphur Fuels in Blast Furnaces. (20) Mar. 12.  
 The Electro-Metallurgical Production of Iron and Steel.\* (12) Mar. 13.  
 Melting Steel with Cast Iron. R. P. Cunningham. (Paper read before the New England Foundrymen's Assoc.) (20) Mar. 19; (13) Apr. 2.  
 Cyanide Process with Anhydrous Peroxide of Cadium. Eugen Schilz. (68) Mar. 21.  
 Width of Furnace Relative to Tonnage in Copper Matte Blast Furnace Practice. W. Randolph Van Liew. (16) Mar. 21.  
 Blast Furnace and Ironworks at Cotte. (12) Mar. 27.  
 Strength of White Iron Castings as Influenced by Heat-Treatment. A. E. Outerbridge, Jr. (Read before the Amer. Soc. for Testing Materials.) (3) Apr.  
 État Actuel des Industries du Fer et d'Acier dans les Provinces du Rhin et de la Westphalie.\* Alexandre Gouvy. (32) Jan.  
 Affinage de la Fonte par le Procédé Talbot à l'Usine de Frodingham (Angleterre). (33) Mar. 21.

**Mining.**

- Copper Mining in Upper Michigan.\* J. F. Jackson. (4) Feb.  
 Recent Developments in Safety Lamps. William Best. (Paper read before the South Staffordshire and East Worcestershire Inst. of Min. Engrs.) (57) Feb. 27.  
 The Cost and the Conditions of Working Collieries in Germany. (22) Serial beginning Mar. 6.  
 Rise and Progress of Coal Mining in the United Kingdom. R. A. S. Redmayne. (57) Serial beginning Mar. 6.  
 The Cost of Pumping at the Short Mountain Colliery of the Lykens Valley Coal Company. R. V. Norris, M. Am. Inst. M. E. (13) Mar. 12.  
 Cost of Shaft Sinking and Drifting at the Lincoln Gold Mine, California. (13) Mar. 19.  
 The Mechanical Engineering of Modern Collieries. William Bardill. (57) Mar. 20.  
 Recent Mining and Milling Costs and Methods on the Mother Lode, California.\* Frank Langford, M. Am. Inst. M. E. (13) Mar. 26.  
 The Theory of Miss Fires. (57) Serial beginning Mar. 27.  
 Shaft Linings.\* (57) Mar. 27.  
 Electricity in Modern Mining Drainage Installations.\* Frank C. Perkins. (46) Mar. 28.  
 The Iron Ore Mines of Biscay.\* Bennett H. Brough. (10) Apr.  
 Water Hoisting in the Pennsylvania Anthracite Regions.\* (45) Apr.  
 Electrical Apparatus for Coal Mining. W. B. Clarke. (45) Apr.  
 Hoisting from Great Depths. Robert Peele. (16) Apr. 4.  
 Minas Nuevas, Parral, Mexico.\* G. A. Burr and Louis S. Cates. (16) Serial beginning Mar. 14.  
 Les Charbonnages du Tonkin.\* F. Schiff. (33) Mar. 14.

**Miscellaneous.**

- The Metric System. C. H. Tutton. (1) Feb.  
 Recording Unit Costs of Contract Work. Emile Low, M. Am. Soc. C. E. (13) Mar. 26.  
 État Actuel des Industries du Fer et d'Acier dans les Provinces du Rhin et de la Westphalie.\* Alexandre Gouvy. (32) Jan.

**Municipal.**

- The Gorter Water Tower (Fire Service).\* H. J. Bennet. (46) Mar. 14.  
 Street Lighting Conditions in New York City and a Proposed Municipal Plant. (13) Mar. 20.  
 The Comparative Cost of Street Lighting in Various Cities. (14) Mar. 21.  
 Methods and Results in Rochester, New York.\* (60) Apr.  
 Some Modern Appliances for Life Saving at Fires.\* (46) Apr. 4.

**Railroad.**

- Diversity of Practice in General Engineering on American Railways.\* Archibald A. Schenck. (4) Feb.  
 The Chicago & North-Western Railway Company's Method of Purifying Water for Locomotive Boilers.\* G. M. Davidson. (61) Feb.



**Railroad—(Continued).**

- Locomotive Front Ends; Piston Valves; Steam and Air Line Connections. (Discussions at meeting of New York R. R. Club.) (65) Feb.
- Heavy Freight Locomotive, Chicago, Burlington & Quincy Railroad.\* (39) Mar.
- Three Cylinder Ten-Wheels Coupled Tank Engine: Great Eastern Railway.\* (21) Mar.
- A Railway Trestle with Bents of Reinforced Concrete.\* Wm. A. Allen, Assoc. M. Am. Soc. C. E. (13) Mar. 12.
- Electric Interlocking at the Lake Shore-Rock Island Terminal.\* (15) Mar. 13.
- Improvements on the Pennsylvania Railroad.\* S. Winery. (15) Serial beginning Mar. 13.
- Railroad Shops.\* Walter G. Berg. (15) Serial beginning Mar. 13.
- "Belpaire" Express Locomotive, Midland Railway.\* (12) Mar. 13.
- A New Yard Design.\* W. C. Cushing. (15) Mar. 13.
- The Rail as a Girder.\* P. H. Dudley. (15) Mar. 13.
- A New Chicago-St. Louis Line.\* (15) Mar. 13.
- Goodwin Cars at Work.\* (15) Mar. 13.
- Tests and Inspection of Cast-Iron Wheels. C. W. Gennet, Jr. (15) Mar. 13.
- Three Cylinder Compound Locomotive for the Midland Railway of England.\* (40) Mar. 13.
- The Purification of Feed Water. J. B. Greer. (Abstract of Paper read before the Ry. Club of Pittsburg.) (40) Mar. 13.
- Improved Methods for Difficult Subaqueous Tunneling.\* (14) Serial beginning Mar. 14.
- The Third Rail on the Baltimore & Ohio.\* W. D. Young. (17) Mar. 14.
- The Mansfield Semaphore Switch Stand.\* (18) Mar. 14.
- Water Softening Plant for the Buffalo, Rochester & Pittsburg Ry.\* (18) Mar. 14.
- Effect of Heavy Wheel Loads on Track and Reduced Cost of Moving Traffic.\* (18) Mar. 14.
- Methods of Surfacing Concrete Culverts: New York Central & Hudson River R. R., Pennsylvania Division.\* George W. Lee, Jun. Am. Soc. C. E. (13) Mar. 19.
- Experience with the Per Diem Car Service Rules. George S. Sipp. (Extracts from paper read before the Richmond R. R. Club.) (15) Mar. 20.
- New Lackawanna Car-Shops; Tool and Power Equipment. (15) Mar. 20.
- The St. Louis Terminal Improvements.\* (15) Mar. 20.
- Chicago & Alton Water Supply.\* (40) Mar. 20.
- The Kansas City, Mexico & Orient Railway Enterprise.\* (40) Mar. 20.
- Relocation of the Chicago, Burlington & Quincy in Western Iowa.\* (40) Mar. 20.
- Preventing Highway Crossing Accidents.\* E. W. Vogel. (40) Mar. 20.
- The Pennsylvania Low-Grade Line and Cut Offs.\* (40) Mar. 20.
- Engineering and Construction of the St. Louis, Kansas City & Colorado Railroad.\* J. L. Campbell, M. Am. Soc. C. E. (40) Mar. 20.
- Pennsylvania Track Elevation at Wilmington, Delaware.\* (40) Mar. 20.
- The New Rock Island—Lake Shore Passenger Station at Chicago.\* (40) Mar. 20.
- The Effect on Track of Modern Equipment and High Speeds. P. H. Dudley. (40) Mar. 20.
- Signalling and Interlocking.\* (Report of the Committee of the Amer. Ry. Eng. and M. of W. Assoc.) (40) Mar. 20; Abstract. (15) March. 27.; Abstract (18) Mar. 21.
- Buildings. (Report of the Committee of the Amer. Ry. Eng. and M. of W. Assoc.) (40) Mar. 20.
- Track. (Report of Committee of the Amer. Ry. Eng. and M. of W. Assoc.) (40) Mar. 20; Abstract (18) Mar. 21.
- Signs, Fences, Crossings and Cattle-Guards.\* (Report of Committee of the Amer. Ry. Eng. and M. of W. Assoc.) (40) Mar. 20.
- Yards and Terminals. (Report of Committee of the Amer. Ry. Eng. and M. of W. Assoc.) (40) Mar. 20.
- Ties. (Report of Committee of the Amer. Ry. Eng. and M. of W. Assoc.) (40) Mar. 20; Abstract (18) Mar. 21.
- Power Equipment of the Pennsylvania Union Station, Pittsburg.\* (14) Mar. 21.
- Northern Ohio Interurban Lines.\* (17) Mar. 21.
- A French Compound Express Passenger Engine.\* (47) Mar. 21.
- Locomotives for the Mediterranean Railway. (11) Mar. 27.
- Atlantic Locomotive for Pennsylvania Lines.\* (40) Mar. 27.
- American and British Railway Practice. (Extract from Report of Lt.-Col. Yorke.) (18) Mar. 28.
- New Electro-Pneumatic Interlocking Plant for the St. Louis Union Station.\* (18) Mar. 28.
- Heavy Passenger Locomotives, Chicago & Alton Railway.\* (39) Apr.
- Topeka Shops of the Atchison, Topeka & Santa Fé Railway.\* (39) Apr.; (13) Apr. 2.
- Railroad Shop Tools. Charles H. Fritch. (39) Serial beginning Apr.
- Electric Traction on Steam Railways. Alton D. Adams. (10) Apr.
- The Application of Individual Motor Drives to Old Machine Tools; McKees Rocks Shops, Pittsburg & Lake Erie R. R.\* R. V. Wright. (25) Serial beginning Apr.
- Experimental Tandem Compound Freight Locomotive, 2 S-10 Type, New York Central & Hudson River Railroad.\* (25) Apr.
- New Passenger Locomotive, Pennsylvania Lines West of Pittsburg, L-12 Type.\* (25) Apr.
- Improved Treatment of Cast Iron Car Wheels. F. E. Seeley. (25) Apr.





**Railroad—(Continued).**

- "Anti-Friction" Car Side Bearings and Center Plates; Pittsburg & Lake Erie. (25) Apr.
- Tunnel at Michel Creek Loop, Crow's Nest Pass Line, Canadian Pacific Ry.\* C. R. Coutlee, M. Can. Soc. C. E. (13) Apr. 2.
- The Safe Course (for Prevention of Collisions). Charles Hansel, M. Am. Soc. C. E. (13) Apr. 2.
- Local Coal Pockets for the Lehigh Valley R. R., at Newark, N. J.\* Walter G. Berg, M. Am. Soc. C. E. (13) Apr. 2; (18) Apr. 4; (40) Apr. 3.
- Mikado (2-8-2) Compounds for the Atchison.\* (15) Apr. 3.
- Water and Rail Terminals. (Extract from Report of Committee of Amer. Ry. Eng. and M. of W. Assoc.) (15) Apr. 3.
- Low Pressure Power Interlocking at Salisbury, England.\* (15) Apr. 3.
- Drainage of English Railroads. Edward Davy Pain, Student, Inst. C. E. (15) Apr. 3.
- Automatic Signal Location. (40) Apr. 3.
- Four-Cylinder Simple Locomotive, Great Northern Railway of England.\* (40) Apr. 3.
- Steel Cars Without Center Sills.\* (40) Apr. 3.
- Labor-Saving Tools at the Baltimore Repair Shops.\* (17) Apr. 4.
- Electric Track Welding.\* Waldon Fawcett. (46) Apr. 4.
- The Distinction between Repairs and Improvements, and a Proposed Classification of Railroad Maintenance of Way Expenses. (14) Apr. 4.
- Electrification of the Cincinnati, Georgetown & Portsmouth R. R.\* (18) Apr. 4.
- Heavy Passenger Locomotives for the Chicago and Alton Railway.\* (18) Apr. 4.
- Wagon Dynamometre de la Compagnie d'Orléans.\* M. Huet. (38) Mar.
- Procédé de Calcul "Par Addition d'Ordonnées" Permettant de Modifier un Tracé de Voies en Vue d'Obtenir une Variation Continue du Rayon de Courbure, Quels Que Soient les Points Singuliers, Obstacles ou Points Commandés, Proposé par M. Pierre Le Fort. (38) Mar.
- Locomotive Type "Atlantic" des Chemins de Fer de l'État Badois. F. Barbier. (33) Mar. 14.
- Machine à Saboter les Traverses de Chemins de Fer, Système Cochet Frères.\* (33) Mar. 21.
- Intercommunication Permanente des Trains en Marche.\* Émile Dieudonné. (36) Mar. 25.

**Railroad, Street.**

- Urban and Inter-Urban Locomotion in America. Robert P. Porter. (11) Serial beginning Mar. 13.
- Safety Devices for Tramway Trolley Wires. Donald Smeaton Munro, A. I. E. E. (26) Serial beginning Mar. 13.
- Improved Methods for Difficult Subaqueous Tunneling.\* (14) Serial beginning Mar. 14.
- Block Signals on an Elevated Railway (Boston Elev. Ry.). (14) Mar. 14.
- Car House Construction.\* (17) Mar. 14.
- The Type of Controllers and Motors to be Used in the New York Subway.\* (17) Mar. 14.
- Brooklyn Rapid Transit Plans. (15) Mar. 20; (17) Mar. 21.
- Westinghouse Motors for the Rapid Transit Subway, New York.\* (17) Mar. 21; (62) Mar. 26; (40) Mar. 27; (18) Mar. 28.
- Test of Subway Motors. (17) Mar. 21.
- Some Interesting Work on the Brooklyn Elevated.\* (17) Mar. 21.
- Electric (High-Speed) Inter-Urban Railways. Lt. Col. Yorke. (Abstract from report to the Bd. of Trade on a visit to America.) (47) Mar. 21.
- The Schuckert Surface Contact Tramway System. (11) Mar. 27.
- The Manhattan Valley Viaduct of the New York Rapid Transit Railroad.\* (14) Mar. 28.
- The Philadelphia Rapid Transit System.\* W. W. Wheatly. (17) Serial beginning Mar. 28.
- Snow Fighting in Buffalo (International Ry. Co.)\* (17) Mar. 28.
- Motor Equipment for New York Subway Cars.\* (39) Apr.
- The Electrification of the Mersey Railway.\* (17) Apr. 4.
- An Interurban Railway near Hamburg, Germany.\* (17) Apr. 4.
- Automotrice à Vapeur, Système V. Purrey pour Tramways et Chemins de Fer. L. Pierre-Guédon. (33) Feb. 28.

**Sanitary.**

- Detroit Sewer System. W. C. King. (1) Jan.
- Ventilating and Heating in the Cornell Medical Building.\* (14) Mar. 14.
- An Efficient Sewer Cleaning Device. (14) Mar. 28.
- Test of a Cast-Iron Heating Surface in Connection with a Fan System of Heating. (14) Mar. 28.
- Floating Disinfecting Stations.\* Day Allen Willey. (10) Apr.
- Concrete Sewers.\* Walter C. Parmley. (60) Apr.
- Further Experiments with a Small Closed Septic Tank at Worcester, Mass. (13) Apr. 2.
- Ventilating and Heating in the Palace of the Crown Prince of Japan.\* (14) Apr. 4.
- Water Supply and Distribution in the Corn Exchange Bank Building, New York.\* (14) Apr. 4.

\* Illustrated.



**Structural.**

- A Comparison of Various Tests Applied to Paints Used for the Protection of Iron. Augustus H. Gill and Charles C. Johnson. (7) Mar.
- Armored Concrete Constructions.\* E. Lee Heidenreich, M. Am. Inst. Min. Engrs. (67) Serial beginning Mar.
- Uniform Tests of Cement. (From Progress Report of Special Committee of the Am. Soc. Civ. Engrs.) (67) Mar.
- Steel-Concrete Construction. A. L. Johnson, M. Am. Soc. C. E. (15) Mar. 13.
- Tests of the Relation between Cross Bending and Direct Compressive Strength in Timber. Clarence A. Martin. (15) Mar. 13.
- Experimental Studies of the Causes of Brittleness of Steel.\* Ch. Fremont. (15) Mar. 13.
- Hydrated Lime and Cement Mixtures. (14) Mar. 14.
- High Concrete Chimney for the Pacific Electric Railway.\* (18) Mar. 14.
- The West Pasengoula Creosoting Works.\* (18) Mar. 14.
- The Restoration of the Foundations of the Philæ Temples.\* (46) Mar. 14.
- British Standard Sections.\* (26) Mar. 19.
- Iron and Steel Structures. (Report made by Committee of the Amer. Ry. Eng. and M. of W. Assoc.) (40) Mar. 20.
- The Montreal Grain Elevator.\* (46) Mar. 21.
- Direct and Indirect Supports for Underpinning a High Wall.\* (14) Mar. 21.
- Concrete Masonry. (Extracts from Report of the Committee of the Amer. Ry. Eng. and M. of W. Assoc.) (15) Mar. 27; (40) Mar. 20.
- The Use of Concrete in Architecture. David Gibson. (60) Apr.
- On the Industrial Importance of Metallography. Albert Sauveur. (3) Apr.
- Notes on Cement and Concrete Construction in the U. S. Government Fortification Work for 1902. (13) Apr. 2.
- Concrete-Steel Chimney for the Pacific Electric Ry. Co., Los Angeles, Cal.\* Jas. D. Schuyler, M. Am. Soc. C. E. (13) Apr. 2.
- Enlarging and Remodeling the Manhattan Life Building.\* (14) Apr. 4.

**Topographical.**

- A New "Automatic" Level Rod.\* (13) Mar. 12.
- A New Method of Making Hydrographic Surveys. James H. Bacon, M. Am. Soc. C. E. (13) Mar. 26.
- Errors in Underground Surveying with the Fast Needle. (57) Mar. 27.
- A Rod for Rapid and Accurate Leveling.\* (14) Apr. 4.

**Water Supply.**

- Administration of Streams in Irrigation.\* Elwood Mead. (4) Feb.
- The Relation of Water-Works Engineers to the Fire Service of Factories. Edward Atkinson. (28) Mar.
- On the Practical Value of Presumptive Tests for *Bacillus Coli* in Water. George C. Whipple. (Paper presented at the meeting of the Amer. Public Health Assoc.) (7) Mar.
- Removal of Color, Organisms and Odor from Water. H. W. Clark. (28) Mar.
- The Physical Properties of Water. Allen Hazen. (28) Mar.
- Opening of the Coolgardie Water-Works. (12) Mar. 13.
- Slow Sand Filtration Plant for Washington, D. C.\* J. S. Schultz. (14) Mar. 14.
- Water in Veins—A Theory. T. A. Rickard. (16) Mar. 14.
- Improved Filtering and Sterilizing System.\* (10) Mar. 14.
- The New Philadelphia Filtration System.\* H. D. Jones. (46) Mar. 14.
- An Impulse Water-Wheel Governed by an Induction Motor. (13) Mar. 19.
- Water Power Electric Plant at Manchester, Conn., for the Cheney Bros.' Silk Mills.\* Earl E. Boardway. (13) Mar. 19.
- Chicago & Alton Water Supply.\* (40) Mar. 20.
- A 185 Foot Water-Power Plant near St. Johns, Newfoundland.\* (14) Mar. 21.
- Tangential Water-Wheels.\* (11) Mar. 27.
- The Hazen-Williams Hydraulic Slide Rule. (14) Mar. 28.
- Report on Improved Water Supply for Toledo, Ohio. (14) Mar. 28.
- The Flood Reservoir at Fossil Creek. H. A. Crafts. (10) Mar. 28.
- Greater Niagara Power Development. Frank C. Perkins. (41) Apr.
- Water Power in South Africa: Electricity from Victoria Falls.\* Francis Fox. (10) Apr.
- Usine Hydro-Électrique des Côtes de Sassenage (Isère)\* Maduit. (33) Mar. 7.
- Hydro-Tachymètre Régulateur pour Turbines Hydrauliques.\* L. Ribourt. (33) Mar. 7.
- Usine d'Ozonisation de Wiesbaden-Schierstein.\* Geo. Renel. (33) Mar. 21.

**Waterways.**

- The Yazoo River Diversion Canal at Vicksburg, Miss.\* (13) Mar. 12.
- The Improvement of the Entrance to Cumberland Sound, Georgia and Florida.\* James H. Bacon, M. Am. Soc. C. E. (13) Mar. 12.
- The Development of Buffalo Harbor.\* Emile Low. (15) Mar. 13.
- U. S. Dreidge General H. M. Robert. (14) Mar. 14.
- The Buffalo Breakwater System.\* (14) Apr. 4.
- Note sur un Problème d'Hydraulique. Ed. Collignon. (37) Feb.
- Les Dragues. A. Baril. (37) Serial beginning Feb.

\* Illustrated.





## AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1852.

## PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

## SOCIETY AFFAIRS.

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**May 6th, 1903.**—The meeting was called to order at 8.55 p. m. President Noble in the chair; Chas. Warren Hunt, Secretary; and present, also, 123 members and 13 guests.

The minutes of the meetings of April 1st and 15th, 1903, were approved as printed in *Proceedings* for April, 1903.

A paper entitled "A Small Rock-Fill Dam," by H. de B. Parsons, M. Am. Soc. C. E., was presented by the author and illustrated with lantern slides. The Secretary presented a written communication from Samuel H. Lea, M. Am. Soc. C. E., and the subject was discussed further by Messrs. Foster Crowell, J. M. Goodell and the author.

A second paper, entitled "Deflections of Beams with Variable Moments of Inertia," by C. W. Hudson, M. Am. Soc. C. E., and a written communication from Irving P. Church, Assoc. Am. Soc. C. E., were presented by title, and the subject was discussed further by Mansfield Merriman, M. Am. Soc. C. E.

Ballots for membership were canvassed, and the following candidates elected:

AS MEMBERS.

FRANK LLOYD AVERILL, Washington, D. C.  
BERNARD BIENENFELD, San Francisco, Cal.  
THOMAS AVERY CORRY, Puebla, Mexico.  
CARLTON ROLLIN DART, Chicago, Ill.  
ERNEST HOWARD FOSTER, New York City.  
KENNETH PHIPSON HAWKSLEY, London, England.  
WILLIAM ROSS HILLYER, West New Brighton, N. Y.  
ERNEST McCULLOH, Seattle, Wash.  
ARCHIBALD McLEAN, Brooklyn, N. Y.  
ASHBEL EDWARD OLMSTED, New York City.  
ISAAC RICH, Boston, Mass.  
EDWARD WHITTEN SHEDD, Providence, R. I.  
JOSEPH EMORY SIRRINE, Greenville, S. C.  
DAVID HEIKES WHITMER, Charleston, S. C.

AS ASSOCIATE MEMBERS.

ASTOLFO BARTOCCINI, New York City.  
CHARLES BLANEY BREED, Lynn, Mass.  
CHARLES JOHN ELD, Jr., St. Joseph, Mo.  
JAMES WELCH FRAZIER, Cleveland, Ohio.  
CHARLES GARTENSTEIG, New York City.  
ROBERT LADD GIFFORD, Chicago, Ill.  
ISAAC HARBY, Trenton, N. J.  
FREDERICK LAWRENCE HARTIGAN, Chicago, Ill.  
DON HAYS, Kansas City, Mo.  
HERMANN MERIWETHER KNAPP, Pencoed, Pa.  
MOSES JEROME LOOK, Clinton, Mass.  
FRANK HOWARD NEFF, Cleveland, Ohio.  
CHARLES EDWARD PARSONS, Glens Falls, N. Y.  
HOWARD PLATT TREADWAY, Kansas City, Mo.  
EARNEST MAITLAND VAN NORDEN, Brooklyn, N. Y.  
HANS VON UNWERTH, Kansas City, Mo.

The Secretary announced the election of the following candidates by the Board of Direction on May 5th, 1903:

AS ASSOCIATE.

CHARLES HENRY UMSTEAD, Portsmouth, N. H.

## AS JUNIORS.

ARTHUR HERBERT DIAMANT, New York City.

CHARLES LOUIS FOX, Wilkinsburg, Pa.

LOUIS ADAMS ROBB, Newark, N. J.

CHARLES RAPELYEA WYCKOFF, Jr., Brooklyn, N. Y.

The Secretary announced the following deaths:

WALTER S. GURNEE, elected Fellow May 10th, 1870; died April 17th, 1903.

EDWARD APPLETON GREENE, elected Member July 4th, 1888; died April 19th, 1903.

VICTOR M. CLEMENT, elected Fellow January 8th, 1890; died April 28th, 1903.

Adjourned.

**May 20th, 1903.**—The meeting was called to order at 8.45 P. M., President Noble in the chair; Chas. Warren Hunt, Secretary; and present, also, 76 members and 7 guests.

A paper entitled "The Economic Improvement of the Coosa and Alabama Rivers, in Georgia and Alabama," by D. M. Andrews, M. Am. Soc. C. E., was presented by the Secretary, who also read a communication on the subject from Capt. R. R. Raymond, Corps of Engineers, U. S. A.

The Secretary announced the death of the following members:

GEORGE RICHARDSON HARDY, elected Member November 7th, 1888; died April 2d, 1903.

EDMUND DORMAN LIBBY, elected Member May 6th, 1885; died April 24th, 1903.

WILLIAM GEORGE MCNEILL THOMPSON, elected Member July 2d, 1879; died May 12th, 1903.

Adjourned.

## OF THE BOARD OF DIRECTION.

(Abstract.)

**May 5th, 1903.**—8.30 P. M.—President Noble in the chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Briggs, Croes, Jackson, Knap, Osborn, Osgood, Pegram and Schneider.

A special report was presented from a Committee appointed to consider the advisability of the discontinuance of advertisements in *Proceedings*, and the Secretary was instructed to discontinue all advertisements in the *Proceedings* of the Society, as soon as it can be done under existing contracts.

Applications were considered and other routine business transacted.

One candidate for admission as Associate, and four as Junior were elected.\*

Adjourned.

\* See page 158.

## ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

### MEETINGS.

**Wednesday, June 3d, 1903.**—8.30 p. m.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper by Richard T. Dana, Assoc. M. Am. Soc. C. E., entitled "A New Safety Explosive," will be presented for discussion. This paper is printed in this number of *Proceedings*.

**Wednesday, September 2d, 1903.**—8.30 p. m.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper entitled "An Experimental Study of the Resistances to the Flow of Water in Pipes," by Augustus V. Saph, Assoc. Am. Soc. C. E., and Ernest W. Schoder, Jun. Am. Soc. C. E., will be presented for discussion. This paper is printed in this number of *Proceedings*.

**Wednesday, September 16th, 1903.**—8.30 p. m.—At this meeting a paper, by Elmo G. Harris, M. Am. Soc. C. E., entitled "Theory of Centrifugal Pumps and Fans: Analysis of their Action, with Suggestions for Designs," will be presented for discussion. This paper is printed in this number of *Proceedings*.

### SEARCHES IN THE LIBRARY.

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many such searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction to the members who have made use of the resources of the Society in this manner has been expressed frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling compared to the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

Copies of all lists of references are filed, so that in many cases it is only necessary to make a typewritten copy, which reduces the cost of searches for members to a minimum.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

### PROPOSED AMENDMENT TO THE CONSTITUTION.

The following proposed amendment to the Constitution has been received by the Secretary, and has been sent to all Corporate Members of the Society. In accordance with the provisions of Section 3 of Article IX of the Constitution, it will be considered at the Business Meeting of the Annual Convention at Asheville, N. C.

Amend the Constitution by striking out Sections 6, 7 and 8 of Article II, and the whole of Article III, and substituting therefor the following:

#### ARTICLE II.—MEMBERSHIP.

\* \* \* \* \*

6.—A Junior shall not be less than eighteen years of age, and his connection with the Society shall cease when he becomes thirty years of age, unless he be previously transferred to another grade. He shall have had active practice in some branch of engineering for at least two years, or he shall have graduated from a school of engineering of recognized standing. Persons who are in the Junior class at the time of the adoption of this Constitution shall not have their status changed by the provisions of this section.

7.—Honorary Members shall be chosen only from persons of acknowledged eminence in some branch of engineering or the sciences related thereto. There shall not be more than twenty at any one time.

8.—Fellows shall be contributors to the permanent funds of the Society, though they may not be eligible for admission as Corporate Members.

#### ARTICLE III.—ADMISSIONS AND EXPULSIONS.

1.—Honorary Members shall be proposed by at least ten members, and shall be elected only by a unanimous vote of the Board of Direction. A Past-President, or a member of the Board of Direction proposed for Honorary Membership, shall not be required to vote either for or against his own admission.

A person elected an Honorary Member shall be promptly notified thereof by letter. The election shall be cancelled if an acceptance is not received within six months after the mailing of such notice.



2.—An application for admission to the Society or for transfer from one grade to another shall embody a concise statement, with dates, of the candidate's professional training and experience; and shall be in a form and in such detail as may be prescribed by the Board of Direction. It shall be signed by the applicant, and shall contain a promise to conform to the requirements of membership, if elected. The applicant shall furnish the names of at least five Corporate Members to whom he is personally known. Each of these shall be requested by the Secretary to address a letter to the Board of Direction, on a form prescribed by said Board, stating the extent of the writer's personal knowledge of the applicant and of his professional work. If at least five of the Corporate Members named as references do not furnish the requisite endorsement, the Secretary shall call upon the applicant for additional names, and not until written communications shall have been received from at least five Corporate Members shall the application be considered by the Board.

Applications of engineers not resident in North America, and who may be so situated as not to be personally known to five Corporate Members, may be recommended for ballot by five members of the Board of Direction, after having secured evidence sufficient, in their opinion, to show that the applicant is worthy of admission.

3.—At stated periods, to be determined by the Board of Direction, there shall be issued to each member in any grade whose address is known, a list of all new applications received for admission or for transfer, which list shall be dated and shall contain a concise statement of the record of each applicant and the names of his references, with a request that members transmit to the Board any information in their possession which may affect the disposition of the applications. Not less than twenty days after the issue of such list, the Board of Direction shall consider these applications, together with any information in regard to the applicants that may have been received; may make further inquiries, if deemed expedient; shall classify the applicant with his consent, and on applications for admission may direct a ballot.

The Board shall have the power to transfer persons from a lower to a higher grade of membership, and shall notify the membership of its action.

4.—The ballots shall be letter-ballots, in a form to be prescribed by the Board of Direction. They shall be mailed to each Corporate Member whose address is known, and shall state the date on which the ballot is to be canvassed, which shall be not less than twenty days after the issue of the ballot. Twenty or more negative votes shall exclude from election. In case of ex-

clusion, no notice thereof shall be entered on the minutes, but the candidate shall be notified.

5.—All elected candidates shall be duly notified and shall subscribe to the Constitution and Rules of the Society. Forms for these purposes shall be prescribed by the Board of Direction. If these provisions are not complied with within six months from the notification of election, such election shall be considered void, unless for special reason the time shall be extended by the Board of Direction.

Membership of any person shall date from the day of his election.

6.—Upon the written request of ten or more Corporate Members, that for cause therein set forth a person belonging to the Society be expelled, the Board of Direction shall consider the matter, and if there appears to be sufficient reason, shall advise the accused of the charges against him. He may, if he so desires, present a written defence which shall be considered at a meeting of the Board of Direction, of which he shall receive due notice. Not less than two months after such meeting, the Board of Direction shall finally consider the case, and if resignation has not been tendered, or a defence made which is satisfactory to the Board, it shall then notify the person that he will be expelled in one month, unless he elects to appeal from this decision. Appeals will be submitted to the Corporate Members by letter-ballot in a form to be prescribed by the Board of Direction. The ballot shall be accompanied by a statement of the charges, and of the action of the Board thereon, with such information as it deems proper, and also the statement of the person making the appeal. The ballot shall be canvassed by the Board not less than twenty days after its issue. A majority of the ballots cast will be required to sustain the action of the Board. The Board will notify the person and the Corporate Members of the result of the ballot. In case no appeal be made, the Board of Direction will expel the person, and notify him and the Corporate Members of its action.

7.—A member of any grade in the Society may resign his membership by a written communication to the Secretary, who shall present the same to the Board of Direction; when, if all his dues have been paid, his resignation shall be accepted.

8.—All persons elected and duly qualified, whose address on the records of the Society is within fifty miles of the Post Office in the City of New York, shall be deemed Resident; and those whose address is beyond that limit shall be deemed Non-Resident.

The classification of each person for the fiscal year as Resident or Non-Resident, shall be determined by the Records of the Society as they may appear on January 1st of that year.

The foregoing amendment is proposed by the following Corporate Members:

JOHN F. WALLACE,	GEO. S. DAVISON,
DAVID SLOAN,	EMIL SWENSSON,
RALPH MODJESKI,	J. A. ATWOOD,
J. W. SCHAUB,	W. C. HAWLEY,
ALBERT F. REICHMANN,	W. G. WILKINS,
C. A. HASBROUCK,	JOSIAH A. BRIGGS,
FRANK J. LLEWELLYN,	J. J. R. CROES,
CHARLES L. STROBEL,	A. NOBLE,
GEO. F. SWAIN,	H. S. HAINES,
WILLIAM JACKSON,	JOS. O. OSGOOD,
JOHN E. CHENEY,	GEO. H. PEGRAM,
S. EVERETT TINKHAM,	EDW. P. NORTH.

### ANNUAL CONVENTION OF 1903.

The Thirty-fifth Annual Convention will be held at Asheville, N. C., June 9th, 10th, 11th and 12th, 1903.

The arrangements for the Convention are in the hands of the following Committees:

#### COMMITTEE OF THE BOARD OF DIRECTION.

J. JAMES R. CROES, <i>Chairman</i> .	
GEORGE H. PEGRAM,	CHAS. WARREN HUNT.

#### LOCAL COMMITTEE.

J. L. LUDLOW, <i>Chairman</i> .	
WILLIAM CAIN,	W. A. LELAND,
WILBUR F. FOSTER,	J. IMBRIE MILLER,
GEORGE W. FRANK,	J. A. MONTGOMERY,
J. C. GUILD,	E. T. D. MYERS,
J. N. HAZLEHURST,	ARTHUR PEW,
W. B. W. HOWE,	GEORGE O. TENNEY,
NISBET WINGFIELD.	

The following programme has been arranged:

**Tuesday, June 9th, 2.00 P.M. Opening Session.**—Address of Welcome by the Hon. Theodore F. Davidson.

Business Meeting: The question as to the time and place for holding the next Annual Convention will be discussed, and a proposed amendment to the Constitution will be taken up in regular course. It is also probable that there will be an infor-

mal consideration of the proposed co-operation of the Society with the other National Societies and the Engineer's Club of New York, in the matter of a Joint Engineering Building.

**8.30 P. M. Second Session.**—Annual address, by Alfred Noble, President, Am. Soc. C. E.

**Wednesday, June 10th, 10.00 A. M. Third Session.**—Professional Discussion on Topics Nos. 1, 2 and 3.

**Afternoon.**—An Excursion by trolley around Asheville and a visit to the Swannanoa Country Club has been arranged for this afternoon.

**9.00 P. M.—Reception.**—The Hon. Charles B. Aycock, Governor of North Carolina, has accepted the invitation of the Local Committee to meet the members and guests of the Society this evening.

**Thursday, June 11th, 10.00 A. M. Fourth Session.**—Professional Discussion on Topics Nos. 4, 5 and 6.

**3.00 P. M.**—Excursion to Sunset Mountain. By invitation of Richard S. Howland, Esq., President, Asheville and Craggy Mountain Railroad Company, the Society will visit Overlook Park, on Sunset Mountain, spending the afternoon and remaining there until after sunset. R. H. Tingley, M. Am. Soc. C. E., will be with the party, and will describe the interesting features of the construction of this road at the Pavilion, on arrival at the Park.

At 5 p. m. the party is invited to a Barbecue by Mr. Howland, and the return to the Hotel will be made about 9 p. m.

**Evening.**—Concert.

**Friday, June 12th, 10.00 A. M. Fifth Session.**—Adjourned Business or Professional Meeting, if necessary; otherwise the morning will be free for individual trips to points of interest in the vicinity.

**1.30 P. M.**—A drive through "Biltmore," the estate of George W. Vanderbilt, Esq., has been arranged for this afternoon.

**9.00 P. M.**—Informal dancing in the ballroom of the Battery Park Hotel.

## TOPICS FOR INFORMAL DISCUSSION.

**Topic No. 1.** Timber Tests.

This discussion will be opened by representatives of the U. S. Bureau of Forestry (see *Proceedings* for April, 1903, p. 133).

**Topic No. 2.** Sewage Purification.

Rudolph Hering, M. Am. Soc. C. E., will introduce this subject.

**Topic No. 3.** In the treatment of the Mississippi River, is the Levee Theory Justified by Experience?

Discussion on this subject will be introduced by B. M. Harrod, Past-President, Am. Soc. C. E.

**Topic No. 4.** Is it possible to make Concrete which will be Impervious to Water? If so, what is the best method?

This discussion will be introduced by William B. Landreth, M. Am. Soc. C. E.

**Topic No. 5.** What is the effect of Sea-Water upon Steel, and upon Steel and Concrete used in Combination, and is the use of Steel in Sea-Water admissible?**Topic No. 6.** In view of the increasing weights of Rolling Stock, for what loadings should Railroad Bridges be designed?

Henry W. Hodge, M. Am. Soc. C. E., will open this discussion.



## ACCESSIONS TO THE LIBRARY.

From April 8th to May 12th, 1903.

## DONATIONS.\*

## A MANUAL OF FIELD AND OFFICE METHODS

For the Use of Students in Surveying. By William D. Pence and Milo S. Ketchum. Third Edition. Leather, 7 x 5 ins., 252 pp., illus. New York, Engineering News Publishing Co., 1902. \$2.00.

The preface states that in preparing this manual the following points have been kept especially in view: (1) To provide a simple and comprehensive text designed to anticipate and supplement, rather than replace, the usual elaborate treatise. (2) To bring the student into immediate familiarity with approved surveying methods. (3) To cultivate the student's skill in the rare arts of keeping good field notes and making reliable calculations. This third edition is issued to meet the call for the manual at various technical institutions and from practicing engineers. With a view to increase the value of the book, both for teaching and for reference purposes, various revisions and additions have been made. Among these are the full scale samples of field notes on the inset sheet at the back of the book. The Contents are: General Instructions; The Chain and Tape; The Compass; The Level; The Transit; Topographic Surveying; Land Surveying; Railroad Surveying; Errors of Surveying; Methods of Computing; Freehand Lettering.

## THE PRINCIPAL SPECIES OF WOOD:

Their Characteristic Properties. By Charles Henry Snow, M. Am. Soc. C. E. Cloth, 10½ x 7 ins., 16 + 203 pp., illus., 39 plates. New York, John Wiley & Sons, 1903. \$3.50.

The preface states that this book is a brief, untechnical presentation of the general features characterizing economically important species of wood. It is the result of notes originally brought together from many already existing sources and later augmented, and verified, as far as possible for present use, by personal observation. This work is intended for those who are not foresters or botanists, but who use woods or desire knowledge of their distinguishing properties. Allusion to trees, historical and other references, aside from those directly regarding woods, are made for completeness and in order to mark, distinguish, or separate the species. The book is divided into three parts: Introduction; Broadleaf or Hardwoods; Needleleaf or Softwoods. There is an index of eleven pages.

## IRRIGATION INSTITUTIONS.

A Discussion of the Economic and Legal Questions Created by the Growth of Irrigated Agriculture in the West. By Elwood Mead. Cloth, 7½ x 5 ins., 11 + 392 pp., illus. New York, The Macmillan Company, 1903. \$1.25. (Donated by the Author.)

The preface states that this work is based on twenty years' experience in the development of irrigated agriculture in the arid West. Fifteen years of this time were devoted to the study and administration of irrigation laws as assistant state engineer of one commonwealth and territorial and state engineer of another. The duties of these positions brought the writer into personal and official relations with all classes of men to whom the problems of irrigation were of vital interest. These included not only farmers, ditch builders, and investigators in irrigation securities, but also legislators and jurists who were shaping the legal principles which are to control the distribution and use of Western water supplies. The Department of Agriculture is studying the methods of distributing and using water in order to promote its more skillful and effective use, and is inquiring into the social and legal questions created by the use of streams in irrigation, both in this country and in other lands. From its beginning the writer has been in charge of these investigations. The convictions expressed have been more largely shaped by what has been seen than by what has been read. The Contents are: Introduction; Land Laws of the Arid Region; The Beginnings of Irrigation; The Doctrine of Appropriation; Contract Water Rights; Measurement of Water; The Duty of Water; Irrigation in Colorado; Irrigation in California; Irrigation in Utah; Irrigation in Wyoming; Irrigation in Other Arid and Semi-arid States; Riparian and Interstate Rights; Methods and Measures Needed for Future Development. There is an index of eight pages.

\* Unless otherwise specified, books in this list have been donated by the Publishers.

**COMPRESSED AIR INFORMATION;**

Or, A Cyclopedia Containing Practical Papers on the Production, Transmission and Use of Compressed Air. Edited by W. L. Saunders, M. Am. Soc. C. E. Cloth, 9 x 6 ins., 1 175 pp., illus. "Compressed Air," New York, copyright 1903. \$5.00. (Donated by the Editor.)

"[This publication has been called for by many inquiries addressed to the editor of *Compressed Air* asking for various papers, some of them original and others compiled, which have been published in that magazine during the first five years of its existence. The supply of the early issues having been long since exhausted and the demand continuing, an effort has been made to present in a single book of reasonable size all the important practical information contained in the first five volumes. No attempt has been made to introduce new matter, but the various papers, editorials and notes have been selected and arranged under suitable headings so that any one seeking information on this subject may be afforded facilities for finding it properly classified. There is an index of seven pages.

**SILICO-CALCAREOUS SANDSTONES.**

Building Stones from Quartz-Sand and Lime. Chemical and Technical Principles of Their Manufacture According to the Situation, Erection, and Management of Brick Works. By Ernst Stöfller. Paper, 36 pp., illus., 5 plates. N. Y., Spon & Chamberlain. \$1.00.

This book describes in detail several processes for making artificial building stone and brick from mixtures of silicious sand and lime; the hardening of the stone being obtained either in the open air or by steam under high or low pressure.

**RULES FOR RAILWAY LOCATION AND CONSTRUCTION**

Used on the Northern Pacific Railway. By E. H. McHenry, M. Am. Soc. C. E. With an Additional Chapter on Estimating Overhaul in Earthwork, Compiled by H. P. Gillette. Cloth, 8 x 5 ins., 88 pp. New York, The Engineering News Publishing Co., 1903. \$1.00.

The Chapter headings are: Construction and Engineering Departments; Location; Surveys and Construction; Track and Ballast; Bridges and Culverts; Accounting and Miscellaneous; Supplies; Estimating Overhaul in Earthwork.

**ENGINEERING STUDIES. Parts III, IV and V.**

By Charles Evan Fowler, M. Am. Soc. C. E. Paper, 10½ x 7 ins., 3 vol., illus. New York, The Engineering News Publishing Co., 1901-1903. 25 cents per vol.

This is a collection of photographic views of engineering works to which short descriptions and criticisms are appended. Parts I and II have appeared previously. The Contents are: Part III. English Stone Arches; Part IV. French Stone Arches; Part V. German and Austrian Stone Arches.

**THE IMPROVEMENT OF RIVERS.**

A Treatise on the Methods Employed for Improving Streams for Open Navigation, and for Navigation by Means of Locks and Dams. By B. F. Thomas, M. Am. Soc. C. E., and D. A. Watt, M. Am. Soc. C. E. Cloth, 12 x 9½ ins., 14 + 356 pp., illus., 92 plates. New York, John Wiley & Sons, 1903. \$6.00 net; postage 47 cents additional.

The object of this work is to provide in concise form a description of the various systems used in bettering the conditions of navigable streams, together with the methods usually adopted for their design and execution. It has been the endeavor to include all the important points of design and construction which are likely to be met, and all calculations have been simplified so as to bring them within the range of those who are not thoroughly educated, yet whose services are most valuable on river work by reason of their practical experience and good judgment. The authors believe that, as this branch of engineering is virtually untaught in the engineering schools of this country, the advent of this treatise will widen the scope of the usual engineering course and prepare students for entering the engineer service of the Government through the junior engineer grade of the civil service. With this object in view hydrographic surveys and reports and examinations have been treated at some length. The Contents are: Introduction; Characteristics of Rivers; Preliminary Examinations and Surveys;

Topographical Surveys and Leveling; Hydrographic Surveys; Removal of Bars and Other Obstructions; Regularization; Dikes and their Effects; Protection of Banks; Levees; Storage Reservoirs; Improvement of River Outlets; General Design and Construction of Works for Creating Slack Water; Locks; Lock Gates and Valves; Fixed Dams; Movable Dams; Needle Dams; Chamoine Wicket Dams; Gates, Curtain and Bridge Dams; Shutter and A-Frame Dams; Drum Wickets and Bear-Traps; Recent Construction of Movable Dams; Dimensions, etc., of Locks and Dams of Certain Rivers; Specifications; Laws for the Protection and Preservation of the Navigable Waters of the United States. There is an index of six pages.

#### ELECTRICITY AS APPLIED TO MINING.

By Arnold Lupton, M. Inst. C. E., M. I. Mech. E., M. Inst. E. E.; G. D. Aspinwall Parr, M. Inst. E. E., A. M. I. Mech. E., and Herbert Perkin, M. I. M. E. Cloth, 9 x 6 ins., 7 + 280 pp., illus. New York, D. Van Nostrand Co., 1903. \$3.50.

The aim of the authors of this volume has been to present the leading truths and main principles of electricity and electrical engineering without going into great detail, their intention being that, for further information on the theory and practice of the subjects of electrical and mining engineering, recourse should be had to some of the many standard works already in existence. They have been unable, in the space at their disposal, to deal with all the varieties of machines and appliances now in use, typical examples of good practice being considered sufficient for the present purpose. The chapter headings are: Introductory; Dynamic Electricity; Driving of the Dynamo; The Steam Turbine; Distribution of Electrical Energy; Starting and Stopping Electrical Generators and Motors; Electric Cables; Central Electrical Plants; Electricity Applied to Pumping and Hauling; Electricity Applied to Coal-Cutting; Typical Electrical Plants Recently Erected; Electric Lighting by Arc and Glow Lamps; Miscellaneous Applications of Electricity; Electricity as Compared with other Modes of Transmitting Power; Dangers of Electricity. There is an index of ten pages.

#### CONDUCTORS FOR ELECTRICAL DISTRIBUTION;

Their Materials and Manufacture, the Calculation of Circuits, Pole-Line Construction, Underground Workings, and other Uses. By F. A. C. Perrine, M. Am. Inst. E. E. Cloth, 9 x 6 ins., 7 + 287 pp., illus. New York, D. Van Nostrand Co., 1903. \$3.50.

The author states in the preface that this book represents the results of over ten years of work as a manufacturer of insulated wires and cables, as an engineer advising concerning their installation and finally as a teacher of electrical engineering. Over eight years has been consumed in actually writing and revising. The original rough cast was published in *Electrical Engineering*, the last chapter appearing three years ago. The author has made a final revision and has presented the whole as a book through the belief that by the previous publication he has been enabled to eliminate from its pages descriptions of materials and methods that are not founded on safe engineering principles. The Contents are: Conductor Materials; Alloyed Conductors; The Manufacture of Wire; Wire-Finishing; Wire Insulation; Cables; Calculation of Circuits; Kelvin's Law of Economy in Conductors; Multiple Arc Distribution; Alternating Current Calculation; Overhead Lines; The Pole Line; Line Insulators; Underground Conductors. There is an index of seven pages.

#### DIRECTORY OF AMERICAN CEMENT INDUSTRIES AND HAND-BOOK FOR CEMENT USERS.

Edited by Charles Carroll Brown, M. Am. Soc. C. E. Cloth, 9 x 6 ins., 645 pp. Municipal Engineering Company, Indianapolis, 1901. (Donated by the Editor.)

The publication of this Directory is the direct result of the many demands for information upon all questions connected with the manufacture, sale, and use of cement which have been made upon the *Municipal Engineering Magazine*, and of the conclusion drawn that the time has now arrived for the publication of such a book, giving more particularly from the practical and commercial standpoints the answers to all the classes of questions which those interested in cement are asking. The Contents are: Preface; Introduction; Testing of Cement; Specifications for Cement; The Uses of Cement; Specifications for the Use of Cement; Data for Estimates of Cement Work; Cement Laboratories; Freight Rates on Cement; Explanation of Reference Notes; Description of Works and of Processes for the Manufacture of Cement; Directory of Cement Brands; Directory of General Sales Agents; Classified Directory of Cement Dealers and Users; Dealers in Cement; Contractors and Large Users of Cement; Engineers, Architects and Other Supervisors of the Use of Cement; Workers in Cement; Cement Tests and Analyses; Machinery and Supplies for Cement Plants; Dealers in Lime and Plaster; Manufacturers of Lime; Manufacturers of Plaster. There is an index of eight pages.



## EXPERIMENTS ON THE FLEXURE OF BEAMS,

Resulting in the Discovery of New Laws of Failure by Buckling.  
By Albert E. Guy. Cloth, 8 x 6 ins., 122 pp., illus. New York, D. Van Nostrand Company, 1903. \$1.25 net.

The preface states that the analogy of the failure of the compression side of a beam by buckling to the method of failure of a long column was, of course, long ago remarked, but it is believed that there has been no previous attempt—certainly no successful attempt—to connect the two by a formula. Mr. Guy's experiments have been successful beyond any reasonable expectation in connecting them and in showing that Euler's formula for long columns is, in fact, the fundamental formula which lies at the base of the whole subject. The Contents are: Introduction; A Simple Problem; The Transverse Shearing; The Longitudinal Shearing; The Deflection of the Beam; Experiments; Corollary; That Simple Problem; The Best Form of Section; The Central Web; The Width of the Section; Example; Solution; The Shape of the Beam; The New Law; Examples.

Gifts have also been received from the following:

- Adams, Arthur L. 1 pam.  
Alaska Mexican Gold Min. Co. 2 pam.  
Alaska United Gold Min. Co. 1 pam.  
Allen, Kenneth. 1 pam.  
Arlington, Mass.—Town Officers. 17 vol.  
Assoc. des Ingénieurs Sortis des Ecoles Speciales de Gand. 1 no.  
Averil, F. L. 1 bound vol.  
Baldwin, Wm. H. 1 pam.  
Bangor, Me.—City Clerk. 19 vol.  
Bay City, Mich.—Water Dept. 1 pam.  
Berg, Walter G. 1 pam.  
Bessemer, Ala.—City Clerk. 3 pam.  
Bixby, W. H. 1 pam.  
Boston, Mass.—City Auditor. 16 bound vol.  
Braunmüller, Wilhelm. 1 pam.  
Bridgeton, N. J.—City Comptroller. 1 pam.  
Brookline, Mass.—Water Board. 1 pam.  
Brooklyn, N. Y.—Pub. Lib. 1 pam.  
Brooks, Frederick. 2 pam.  
Brown, C. C. 1 bound vol.  
Canada Southern Ry. Co. 1 pam.  
Carter, W. J. 2 bound vol.  
Chattanooga, Tenn.—City Engr. 1 vol., 2 pam.  
Church, C. F. 4 pam.  
Cincinnati, Ohio—City Auditor. 20 bound vol.  
Cincinnati, Ohio—Water Dept. 1 pam.  
Coll. of the City of N. Y. 26 pam.  
Colo.—Agri. Exper. Station. 1 vol.  
Columbian Univ. 9 vol.  
Columbus, Ohio—City Clerk. 10 bound vol.  
Concord, N. H.—City Engr. 6 pam.  
Concord, N. H.—Water Dept. 1 pam.  
Conn.—State Board of Health. 1 bound vol.  
Cornell Univ. 1 vol.  
Corthell, E. L. 1 pam.  
Davis, C. B. 2 pam.  
Des Moines, Iowa—City Engr. 1 pam.  
Eddy, Harrison P. 1 pam.  
Eng. Soc., School of Practical Science. 1 vol.  
Engrs. Club of Cincinnati. 2 pam.  
Ericson, John. 1 bound vol.  
Erie, Pa.—City Clerk. 1 pam.  
Field Columbian Museum. 1 pam.  
Fitchburg, Mass.—City Engr. 6 pam.  
Gloversville, N. Y.—City Clerk. 13 pam.  
Grand Rapids, Mich.—City Engr. 1 bound vol., 4 pam.  
Great Brit.—Patent Office. 9 pam.  
Greenalch, Wallace. 10 bound vols., 3 pam.  
Griggs, Julian. 11 vol., 5 pam.  
Hatt, W. Kendrick. 1 pam.  
Haven, W. A. 1 pam.  
Haverhill, Mass.—City Engr. 5 pam.  
Haverhill, Mass.—Water Comms. 1 pam.  
Herschel, Clemens. 1 bound vol.  
Heyland, Alexander. 2 pam.  
Inst. of Civ. Engrs. 3 pam.  
Jackson, William. 12 pam., 1 vol.  
Jacksonville, Fla.—Trustees of Water-Works. 1 pam.  
Jersey City, N. J.—Board of Street and Water Comms. 6 pam.  
Koninklijk Inst. van Ingenieurs. 2 pam.  
Lake Erie and Western R. R. Co. 1 pam.  
Lake Shore & Michigan Southern Ry. Co. 1 pam.  
Ludlow, Mrs. William. 1 bound vol.  
Madras—Pub. Works Dept. 2 bound vol.  
Md.—Geol. Surv. 7 bound vol.  
Merridith, G. H. 2 pam.  
Mexican Central Ry. Co., Ltd. 1 pam.  
Michigan Central R. R. Co. 1 pam.  
Milwaukee, Wis.—Pub. Works Dept. 1 vol.  
Morrison, George S. 1 pam.  
National R. R. Co. of Mexico. 1 pam.  
N. J.—State Geologist. 2 bound vol.  
New York, Chicago & St. Louis R. R. Co. 1 pam.  
N. Y. Coll. of Forestry. 2 pam.  
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Ziffer, E. A. 1 vol.

## BY PURCHASE.

**Electrotechnik in Einzeldarstellungen.** Unter Mitwirkung hervorragender Fachmänner Herausgegeben von Dr. Gustav Benischke. Vol. I. Braunschweig, Friedrich Vieweg und Sohn, 1902.

**Die Wechselstromtechnik.** Herausgegeben von E. Arnold. Vol. I. Berlin, Julius Springer, 1902.

**A Systematic Method of Calculating the Dimensions of Direct-Current Dynamo-Electric Machines.** By Carl Kinsley. Chicago, The University of Chicago Press, 1903.

**Secondary Batteries: Their Theory, Construction and Use.** By E. J. Wade. New York, The D. Van Nostrand Co.; London, "The Electrician" Printing and Publishing Company.

**Wireless Telegraphy. A Popular Exposition.** By G. W. Tunnellmann. Third Edition. London, The Office of "Knowledge," 1902.

**Supplement to the Directory to the Iron and Steel Works of the United States.** Containing a Classified List of Leading Consumers of Iron and Steel in the United States. Compiled by the American Iron and Steel Association. Corrected to January, 1903. Philadelphia, The American Iron and Steel Association, 1903.

**Proceedings of the Purdue Society of Civil Engineering.** 1896, 98, 1900-01. Purdue University, Lafayette, Ind., 1896-1901.

**First Annual Report of the Wisconsin Engineers' Society,** Containing Papers Read at the Annual Meeting Held at Appleton, March 30, 1897. No place, 1897.

**Proceedings of the Annual Meeting of the Indiana Engineering Society.** 1893 and 1896. South Bend, 1893-96.

**Proceedings of the Iowa Civil Engineers' and Surveyors' Society** at their Ninth Annual Meeting held at Ottumwa, Iowa, January 20-21, 1897. Glenwood, Iowa, 1897.

**Eighteenth Annual Report of the Ohio Society of Surveyors and Civil Engineers,** being the Transactions of the Society at its Eighteenth Annual Meeting Held in Columbus, Ohio, January 18, 19 and 20, 1897. Columbus, 1897.

**Annual Report of the Association of Ontario Land Surveyors,** 1889, 1892-1900. Toronto, 1889-1900.

**Notes on Concrete and Works in Concrete.** Especially written to Assist those Engaged upon Public Works. By John Newman. Second Edition. Revised and Enlarged. London, E. & F. N. Spon; New York, Spon & Chamberlain, 1894.

**Pumps and Pump Motors.** A Manual for the Use of Hydraulic Engineers. By Philip R. Bjorling. 2 vol. London, E. & F. N. Spon; New York, Spon & Chamberlain, 1895.



**The Principles, Construction and Application of Pumping Machinery** (Steam and Water Pressure). With Practical Illustrations of Engines and Pumps applied to Mining, Town Water Supply, Drainage of Lands, etc., also Economy and Efficiency Trials of Pumping Machinery. By Henry Davey. London, Charles Griffin & Company, Limited; Philadelphia, J. B. Lippincott Company, 1900.

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#### SUMMARY OF ACCESSIONS.

April 8th to May 12th, 1903.

Donations (including 41 duplicates and 1 number completing volume of periodical).....	385
By purchase.....	27
Total.....	412

## MEMBERSHIP.

## ADDITIONS.

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		Date of Membership.
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BOSLER, HARRY SHEEMAN. 209 Houston St., Chattanooga, Tenn. ....		Feb. 4, 1903
DART, CARLTON ROLLIN. Bridge Engr., San. Dist. of Chicago. 555 Monroe St., Chicago, Ill. ....		May 6, 1903
EMMONS, CHARLES MORTON. Asst. Engr., Penn. Bridge Co., Beaver Falls, Pa. ....		April 1, 1903
FOSTER, ERNEST HOWARD. Vice-Pres., Power Specialty Co., 126 Liberty St., New York City. ....		May 6, 1903
FRENCH, OWEN BERT. Asst., U. S. Coast and Geodetic Survey, Washington, D. C. ....		April 1, 1903
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GOODELL, JOHN MILTON.....	Editor, <i>The Engineering Record</i> , 114 Liberty St., New York City.
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YOUNG, HENRY AMERMAN.....	U. S. Engr.'s Office, Fort Washington, Md.

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#### RESIGNATIONS.

MEMBERS.	Date of Resignation.
MONCURE, WILLIAM.....	May 5th, 1903

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#### DEATHS.

CARD, WILLIAM WARREN.....	Elected Member, September 5th, 1883; died April 4th, 1903.
CLEMENT, VICTOR M.....	Elected Fellow, January 8th, 1890; died April 28th, 1903.
GREENE, EDWARD APPLETON.....	Elected Member, July 4th, 1888; died April 19th, 1903.
GURNEE, WALTER S.....	Elected Fellow, May 10th, 1870; died April 17th, 1903.

## MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(April 8th to May 12th, 1903.)

NOTE.—*This list is published for the purpose of placing before the members of the Society the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

### LIST OF PUBLICATIONS.

*In the subjoined list of articles references are given by the number prefixed to each journal in this list.*

- (1) *Journal, Assoc. Eng. Soc.*, 257 South Fourth St., Philadelphia, Pa., 30c.
- (2) *Proceedings, Engrs. Club of Phila.*, 1122 Girard St., Philadelphia, Pa.
- (3) *Journal, Franklin Inst.*, Philadelphia, Pa., 50c.
- (4) *Journal, Western Soc. of Engrs.*, Monadnock Block, Chicago, Ill.
- (5) *Transactions, Can. Soc. C. E.*, Montreal, Que., Canada.
- (6) *School of Mines Quarterly*, Columbia Univ., New York City, 50c.
- (7) *Technology Quarterly*, Mass. Inst. Tech., Boston, Mass., 75c.
- (8) *Stevens Institute Indicator*, Stevens Inst., Hoboken, N. J., 50c.
- (9) *Engineering Magazine*, New York City, 25c.
- (10) *Cassier's Magazine*, New York City, 25c.
- (11) *Engineering* (London), W. H. Wiley, New York City, 25c.
- (12) *The Engineer* (London), International News Co., New York City, 35c.
- (13) *Engineering News*, New York City, 15c.
- (14) *The Engineering Record*, New York City, 12c.
- (15) *Railroad Gazette*, New York City, 10c.
- (16) *Engineering and Mining Journal*, New York City, 15c.
- (17) *Street Railway Journal*, New York City, 35c.
- (18) *Railway and Engineering Review*, Chicago, Ill., 10c.
- (19) *Scientific American Supplement*, New York City, 10c.
- (20) *Iron Age*, New York City, 10c.
- (21) *Railway Engineer*, London, England, 25c.
- (22) *Iron and Coal Trades Review*, London, England, 25c.
- (23) *Bulletin, American Iron and Steel Assoc.*, Philadelphia, Pa.
- (24) *American Gas Light Journal*, New York City, 10c.
- (25) *American Engineer*, New York City, 20c.
- (26) *Electrical Review*, London, England.
- (27) *Electrical World and Engineer*, New York City, 10c.
- (28) *Journal, New England Water-Works Assoc.*, Boston, \$1.
- (29) *Journal, Society of Arts*, London, England, 15c.
- (30) *Annales des Travaux Publics de Belgique*, Brussels, Belgium.
- (31) *Annales de l'Assoc. des Ing. Sortis des École Spéciales de Gand*, Brussels, Belgium.
- (32) *Mémoires et Compte Rendu des Travaux*, Soc. Ing. Civ. de France, Paris, France.
- (33) *Le Génie Civil*, Paris, France.
- (34) *Portefeuille Économique des Machines*, Paris, France.
- (35) *Nouvelles Annales de la Construction*, Paris, France.
- (36) *La Revue Technique*, Paris, France.
- (37) *Revue de Mécanique*, Paris, France.
- (38) *Revue Générale des Chemins de Fer et des Tramways*, Paris, France.
- (39) *Railway Master Mechanic*, Chicago, Ill., 10c.
- (40) *Railway Age*, Chicago, Ill., 10c.
- (41) *Modern Machinery*, Chicago, Ill., 10c.
- (42) *Transactions, Am. Inst. Elec. Engrs.*, New York City, 50c.
- (43) *Annales des Ponts et Chaussées*, Paris, France.
- (44) *Journal, Military Service Institution, Governor's Island*, New York Harbor, 50c.
- (45) *Mines and Minerals*, Scranton, Pa., 20c.
- (46) *Scientific American*, New York City, 8c.
- (47) *Mechanical Engineer*, Manchester, England.
- (48) *Transactions, Am. Soc. C. E.*, New York City, \$5.
- (49) *Transactions, Am. Soc. M. E.*, New York City, \$10.
- (50) *Transactions, Am. Inst. Min. Engrs.*, New York City, \$5.
- (51) *Colliery Guardian*, London, England.
- (52) *Proceedings, Eng. Soc. W. Pa.*, 410 Penn Ave., Pittsburgh, Pa., 50c.
- (53) *Transactions, Mining Inst. of Scotland*, London and Newcastle-upon-Tyne.
- (54) *Municipal Engineering*, Indianapolis, Ind., 25c.
- (55) *Proceedings, Western Railway Club*, 225 Dearborn St., Chicago, Ill., 25c.
- (56) *American Manufacturer and Iron World*, 59 Ninth St., Pittsburgh, Pa.
- (57) *Minutes of Proceedings, Inst. C. E.*, London, England.
- (58) *Power*, New York City, 20c.
- (59) *Official Proceedings, New York Railroad Club*, Brooklyn, N. Y., 15c.
- (60) *Journal of Gas Lighting*, London, England, 15c.
- (61) *Cement and Engineering News*, Chicago, Ill., 25c.
- (62) *Mining Journal*, London, England.

## LIST OF ARTICLES.

**Bridge.**

- Essentials Necessary for Successful Practice in Bridge Engineering. J. E. Greiner, M. Am. Soc. C. E. (Extracts from lecture delivered before students of Cornell Univ.) (13) Apr. 9.
- The Rio Grande Bridge of the El Paso & Southwestern R. R. near El Paso, Tex.\* R. A. Thompson. (13) Apr. 9.
- The Des Moines River Viaduct of the Mason City & Fort Dodge R. R., at Fort Dodge, Ia.\* H. C. Keith. (13) Apr. 9.
- New Railway Bridge over the Tyne.\* (12) Apr. 10.
- Types and Details of Bridge Construction.\* Frank W. Skinner. (14) Serial beginning Apr. 11.
- Theory and Calculation of the Two-Hinged Spandrel-Braced Arch. Alex. Rice McKim. (14) Apr. 11.
- Drawbridge Calculations. Edward Godfrey. (13) Apr. 16.
- The Paderno Viaduct, Italy.\* (12) Serial beginning Apr. 17.
- The Ouachita River Bridge, Missouri Pacific Railway.\* (40) Apr. 17.
- A Steel Truss Highway Bridge with Concrete Floor.\* (14) Apr. 25.
- Erection of the Manhattan Approaches to the Williamsburg Bridge.\* (14) May 9.
- Le Viaduc du Viar (Ligne de Carmaux à Rodez)\* R. Godfernaux. (30) Apr.

**Electrical.**

- The Arcophone. R. A. L. Snyder. (42) Mar.
- Telephone Service. S. J. Larned. (4) Apr.
- The Development, Equipment and Operation of the Sub-Stations and Distributing Systems of the Chicago Edison Co. and Commonwealth Electric Co. Ernest F. Smith. (4) Apr.
- Grounding of Alternate Current Systems. Geo. N. Eastman. (4) Apr.
- The Engineering of Illumination.\* Van Rensselaer Lansingh. (4) Apr.
- Electricity Works of Tunbridge Wells.\* (26) Apr. 3.
- On the Application of Three-Phase Motors to the Electrical Driving of Workshops and Factories.\* A. C. Eborall. (20) Apr. 3.
- Laboratory Electric Furnace Equipment, Owens College, Manchester, England.\* (27) Apr. 4.
- Electrical Manufacture of Steel in Sweden.\* G. Lindman. (27) Apr. 4.
- Electrical Extensions at Willesden. (12) Serial beginning Apr. 10.
- Sheet Steel for Static Transformers. Walter S. Moody. (27) Apr. 11.
- De Forest Wireless Telegraph System. A. Frederick Collins. (27) Apr. 11.
- Wireless Telegraphy in the United States. E. Guarini. (26) Serial beginning Apr. 17.
- Some Notes on Electrically Driven Winding Engines.\* (57) Apr. 17.
- Vancouver Transmission Plant.\* Wyatt H. Allen. (27) Apr. 18.
- The Lodge-Muirhead System of Wireless Telegraphy.\* H. C. Fyfe. (46) Apr. 18.
- Insulating Materials: A Field for the Chemist. Max von Recklinghausen. (Paper read before the Amer. Electrochemical Soc.) (13) April 23.
- Electric Safety Fuses. (26) Apr. 24.
- The Development of Marconi's System of Wireless Telegraphy.\* Emile Guarini. (19) Serial beginning Apr. 25.
- Telephone Exchanges.\* Arthur V. Abbott. (27) Serial beginning April 25.
- Corrosion of Metals by Electrolysis. A. A. Knudson. (Abstract of paper read before the Amer. Electrochemical Soc.) (27) Apr. 25.
- Development in Telephone Switchboard Equipment at Bloomington, Ill.\* (27) Apr. 25.
- Core Type Transformers.\* (27) Apr. 25.
- General Specifications for the Construction of Telephone Aerial Lines.\* (27) Apr. 25.
- The Telegraphone and the British Post-Office.\* Herbert C. Fyfe. (46) Apr. 25.
- The Cascade Water, Power and Light Co., Cascade, B. C., Canada. W. G. McConnon. (27) Apr. 25; (18) Apr. 25; (14) May 2.
- Notes on Recent Electrical and Scientific Developments Abroad.\* William J. Hammer. (3) Serial beginning May.
- Small Water Powers with High Heads for Electric Lighting.\* Thoburn Reid. (10) May.
- The Central Avenue Power Station (Kansas City)\* H. S. Badger and G. E. Schreiber. (64) May.
- The Motive Power of the Future.\* Horace D. B. How. (Abstract of paper read before the South Wales Inst. of Engrs.) (22) May 1.
- The New Aberdeen Electricity Works.\* (26) May 1.
- Electricity Supply for Small Towns and Villages. (47) May 2.
- The New Brussels Telephone Exchange.\* (27) May 2.
- The Blondel Oscillograph.\* (27) May 2.
- Electrical Equipment of the Farmer's Bank Building, Pittsburg.\* L. L. Emerson. (14) May 3.
- A Twenty-Ton Switching Electric Storage Battery Locomotive.\* (16) May 9.
- Improvements in the Du Bois Electric & Traction System.\* (17) May 9.
- The Arnold-Bragstad-La Cour Polycyclic Power Transmission System.\* O. S. Bragstad. (27) May 9.

\* Illustrated.

**Electrical—(Continued).**

- La Dactyle Électrique.\* O. Rochefort. (32) Feb.  
 Notes sur les Installations Hydro-Électriques de Rheinfelden, de Zurich et de Schwyz, en Suisse.\* G. Herman. (30) Apr.  
 Fonctionnement de l'Éclairage Électrique sur les Réseaux de Traction. Maurice Soubrier. (36) Serial beginning April 10.

**Marine.**

- On the Effect of Modern Accessories on the Size and Cost of Warships. W. H. Whiting. (Paper read before the Inst. of Naval Archts.) (12) Apr. 3; (11) Apr. 3.  
 On the "Lines" of Fast Cruisers.\* C. C. P. FitzGerald. (Paper read before the Inst. of Naval Archts.) (11) Apr. 3.  
 Carbonic Anhydride Refrigerating Machinery for Marine Use.\* S. H. Bunnell. (13) Apr. 9.  
 The Naval Boiler Problem: Test of the Hohenstein Boiler.\* John Halligan, Jr. (From the *Journal of the Amer. Soc. of Naval Engrs.*) (13) Apr. 9.  
 The Screw as a Means of Propulsion for Shallow-Draft Vessels.\* A. F. Yarrow. (Paper read before the Inst. of Naval Archts.) (12) Apr. 10; (11) Apr. 10.  
 The Ljungström Condenser as Applied to Marine Engines. William Cross. (Paper read before the Inst. of Naval Archts.) (12) Apr. 3; (11) Apr. 17.  
 The Ballasting of Steamers for North Atlantic Voyages.\* S. J. P. Thearle. (11) Apr. 17.  
 Screw Steamer for Towing, Salvage and Fire Purposes.\* (11) Apr. 17.  
 The Italian First-Class Battleship *Benedetto Brin*.\* (12) Apr. 17.  
 Results of a Naval Inquiry as to Which is the Most Powerful Armor-Clad Afloat. (10) Apr. 18.  
 Corrosion in Metal Pipes on Board Ship. A. W. Stewart. (Paper read before the Inst. of Naval Archts.) (11) Apr. 24.  
 Marine Installations for the Carriage of Refrigerated Cargoes.\* R. Balfour. (Paper read before the Inst. of Naval Archts.) (12) Apr. 24.  
 Les Machines du Croiseur Protégé Russe *Bogatyr*.\* (36) Apr. 10.

**Mechanical.**

- On the Use of Beaumont Oil as a Fuel. Henry H. Humphrey. (1) Mar.  
 The Handling and Storing of Iron Ore. Charles Piez. (2) Apr.  
 The Slip of Belts. J. Stormonth. (12) Apr. 3.  
 The Valuation of Coals. E. L. Rhead. (22) Apr. 3.  
 Coking Badly Caking Coal: A New Mechanical Process.\* (22) Apr. 3.  
 Slotting and Drilling Machines.\* Thomas R. Shaw. (47) Serial beginning Apr. 4.  
 Power Production by Gas Producers and Engines.\* Robert W. A. Brewer, A. M. I. C. E. (Paper read before the Civil and Mechanical Engrs. Soc.) (47) Serial beginning Apr. 4.  
 Carbonic Anhydride Refrigerating Machinery for Marine Use.\* S. H. Bunnell. (13) Apr. 9.  
 Blooming Mill of the Röchling Iron and Steel Works. (11) Apr. 10.  
 The Curtis Steam Turbine.\* W. L. R. Emmet. (Paper read before the Amer. Philosophical Soc.) (17) Apr. 11; (27) Apr. 11; (64) May; (18) May 2; Extracts (14) Apr. 11.  
 The Locomobile Gasoline Car.\* (46) Apr. 11.  
 The Mond Power-Gas Process.\* (66) Apr. 14.  
 Queen's Engineering Works, Bedford.\* (26) Apr. 17.  
 Power Plant for the New Government Building at San Francisco.\* (14) Apr. 18.  
 The Design and Testing of Centrifugal Fans.\* W. Gilbert, A. M. I. C. E. (Paper read before the Civil and Mechanical Engrs. Soc.) (22) Apr. 24; (47) Serial beginning Apr. 18.  
 The Pedrail—A New Type of Road Locomotive.\* Herbert C. Fyfe. (46) Apr. 18.  
 Some Special and Peculiar Types of Vertical Boilers.\* William H. Fowler, M. Inst. C. E. (47) Apr. 18.  
 Transmission of Power by Compressed Air. W. C. Popplewell, A. M. Inst. C. E. (47) Apr. 18.  
 Gas Manufacture for 1903 at the Old Kent Road. (66) Apr. 21.  
 Moving a 110-Ft. Steel Chimney.\* (13) Apr. 23.  
 Measuring the Power Required for Sheet Rolling Mills. H. G. Manning, M. Am. Soc. M. E. (13) Apr. 23.  
 Chill Rolls: The Problems of Their Manufacture and Use. B. E. V. Luty. (20) Serial beginning Apr. 23.  
 Machinery for the Panama Canal.\* Waldon Fawcett. (62) Apr. 23.  
 Wind-Engines at the Royal Agricultural Society's Ground, Ealing.\* (11) Apr. 24.  
 Modern Development of the Steam Turbine.\* Frank C. Perkins. (46) Apr. 25.  
 Blue Water Gas and Its Enrichment by the Peebles Oil Gas Process.\* E. J. Brockway. (Paper read before the Eastern Counties Gas Mgrs. Assoc.) (66) Apr. 28.  
 A Chain with Detachable Links.\* (13) Apr. 30.  
 The New Works of the American Turret Lathe Mfg. Company.\* (20) Apr. 30.  
 The Manufacture of Slag Bricks and Slag Blocks. Edwin C. Eckel, Assoc. Am. Soc. C. E. (13) Apr. 30.  
 Liquid Fuel for Power Purposes. Arthur L. Williston. (9) May.

\* Illustrated.





**Mechanical—(Continued).**

- Modern American Machine Tools, from the Standpoint of a Designer.\* Charles H. Benjamin. (10) May.
- Distributing Illuminating Gas at High Pressure: Some Examples from American Practice. F. H. Shelton. (10) May.
- Valve Gear of the Porter-Allen Engine.\* (64) May.
- The Cotton Oil Industry in America.\* D. A. Tompkins. (10) May.
- Recent Steam Turbine Applications, with Data of Performances.\* G. L. Parsons. (10) May.
- Layout of Corliss Valve Gears.\* Sanford A. Moss. (64) Serial beginning May.
- The Hult Rotary Steam Engine.\* (20) May 1.
- The New Armour-Plate Mill at Creusot.\* (11) May 1.
- The Royal Agricultural Society's Windmill Trials.\* (12) May 1.
- Producer Gas. A. Humboldt Sexton. (47) Serial beginning May 2.
- The Manufacture and Properties of Hollow Pressed Steel Car Axles.\* Camille Mercader. (Paper read before the Iron and Steel Inst.) (20) Serial beginning May 7; (40) May 8; (18) May 9; Abstract (13) May 7.
- Petroleum and Petroleum Lubricants. William F. Parrish, Jr. (Paper presented before the New England St. Ry. Club.) (17) May 9.
- The Use of Reheaters in Compound Engines. (14) May 9.
- A Double Drum Boiler.\* (14) May 9.
- Les Moteurs à Alcool au Concours International de 1902 (Resultats des Expériences Faites à la Station d'Essais de Machines). Max Ringelmann. (37) Mar.
- Les Installations Nouvelles de la Sucrerie Centrale de Cambrai, à Escaudœuvres.\* E. J. Brunswick. (33) Serial beginning Apr. 18.
- Les Machines à Vapeur à l'Exposition de Düsseldorf.\* P. F. Dujardin. (33) Apr. 25.

**Metallurgical.**

- Electrical Manufacture of Steel in Sweden.\* G. Lindman. (27) Apr. 4.
- Metallic Conduction and the Constitution of Alloys. John Alexander Mathews. (62) Apr. 6.
- The New Furnaces at the Rio Tinto Works.\* (16) Apr. 18.
- Refining Gold by Electrolysis. (19) Apr. 18.
- Smelting of Raw Sulphide Ores at Ducktown.\* W. H. Freeland. (16) May 2.
- The Krupp Works at Essen.\* Day Allen Willey. (19) Serial beginning May 9.
- L'État Actuel de Nos Connaissances sur la Constitution des Aciers au Carbone. Léon Guiller. (33) Serial beginning Apr. 4.
- Les Nouveaux Procédés d'Extraction de l'Or: Procédé Riecken.\* F. Schiff. (33) Apr. 11.

**Military.**

- The Springfield Magazine Rifle, Model 1902.\* (44) May-June.

**Mining.**

- Electrical Coal-Cutting Machines.\* Fredk. W. Hurd. (59) Vol. xxv, Pt. 3.
- Electric Winding Engines.\* E. Kilburn Scott, M. I. E. E. (22) Serial beginning Apr. 3.
- A New Ventilating Fan and Engine at Littleton Colliery, Cannock.\* (22) Apr. 3.
- Outbursts of Firedamp in Mines. (57) April 3.
- Central Electric Power Stations for Gold Mines. J. W. Kirkland. (Paper read before the Mech. Engrs. Assoc. of the Witwatersrand.) (47) Apr. 4.
- Mining Methods on the Klondike.\* Eugene Haanel. (16) Apr. 11.
- Diamond Drilling. J. N. Justice. (Abstract of paper read before the Inst. of Mining and Metallurgy.) (22) Apr. 24.
- Systematic Timbering in Continental Mines.\* (57) Serial beginning Apr. 24.
- Hoisting from Great Depths. Hans C. Behr. (16) Serial beginning Apr. 25.
- Miner's Pthisis and Dust in Mines. William Cullen. (16) Apr. 25.
- Chain and Pick Coal Cutting Machines.\* H. S. Johnson. (16) Apr. 25.
- The Paff and Williams System of Electrical Prospecting for Mineral Ores.\* (27) Apr. 25.
- The Stewart River Gold Dredge.\* A. W. Robinson. (Paper read before the Canadian Mining Inst.) (68) Apr. 25; (16) May 2.
- A Practical System of Mine Accounting. F. Jacobs. (9) May.
- The Weir-Pittsburg District of the Kansas Coal Field.\* W. R. Crane. (45) May.
- Electric Mining Drills.\* (45) May.
- Present Practice in Gold Dredging. (45) May.
- Third-Rail Tail-Rope Haulage System.\* (45) May.
- Timbering in the Collieries of Saxony and Austria.\* (22) May 1.
- Electricity in Mines.\* (57) May 1.
- A Modern Method of Coal Washing.\* C. A. Meissner. (Paper read before the Nova Scotia Mining Soc.) (16) May 3.
- The Edison Dry Process for the Separation of Gold from Gravel.\* Cloyd M. Chapman. (16) May 3.

**Miscellaneous.**

- The Engineering of Illumination.\* Van Rensselaer Lansingh. (4) Apr.
- The "State of the Art" in Patent Cases. H. Bovie Schermerhorn. (2) Apr.



**Miscellaneous—(Continued).**

- Engineering Work on the Louisiana Purchase Exposition at St. Louis.\* (13) Apr. 23.  
 The Louisiana Purchase Exposition at St. Louis: The Present Status.\* (20) Apr. 23.  
 The Education of Engineers in America, Germany and Switzerland. W. E. Dalby.  
 Paper read before the Inst. of Mech. Engrs. (11) May 1.

**Municipal.**

- Portland Cement Sidewalk Construction. (67) Serial beginning Apr.  
 The Misuse of Public Sidewalk Areas and Vaults. Reginald Pelham Bolton, M. Am. Soc. C. E. (14) Apr. 18.  
 A Defense of the High Prices for Street Lighting in New York, and a Reply Thereto. (13) Apr. 23.  
 The Dirt Road. G. A. Roullier, M. Am. Soc. C. E. (14) Apr. 25.  
 Coal-Tar Pavements in Northern New England. (14) Apr. 25.  
 Road Laws of Illinois. Ira O. Baker. (14) Apr. 25.  
 Massachusetts State Highways.\* A. B. Fletcher. (14) Apr. 25.  
 State Highway Laws of New Jersey. (14) Apr. 25.  
 New York State Aid Road Laws. (14) Apr. 25.  
 Road Construction and Maintenance in Europe. (14) Apr. 25.  
 The Use of Oil on Roads. Hiram M. Chittenden. (13) Apr. 23; (14) Apr. 25.  
 A Few Thoughts on Present Practice of Road Construction. James Owen, M. Am. Soc. C. E. (14) Apr. 25.  
 Progress of Steel Roads. Roy Stone. (14) Apr. 25.  
 New Methods of Road Construction. Fred J. Warren. (14) Apr. 25.  
 Brick as a Paving Material. (60) May.  
 Improved Maintenance of Earth Roads.\* Henry P. Morrison, M. Am. Soc. C. E. (14) May 2.  
 L'Organisation du Service de la Voirie par Terre en Belgique. A. Bernard. (30) Apr.

**Railroad.**

- Pittsburgh—Her Waterways and Her Railways. Antes Snyder. (58) Feb.  
 Freight Congestion; Train and Yard Classification; Delays En Route; Causes; Remedies. Walter C. Herron. (58) Feb.  
 An Electric Car Lighting System.\* W. L. Bliss. (42) Mar.  
 Axle Lighting. Elmer A. Sperry. (42) Mar.  
 An Axle-Light System of Train Lighting.\* Arthur J. Farnsworth. (42) Mar.  
 Some of the Problems of Electric Train Lighting. Geo. D. Shepardson. (42) Mar.  
 Heating and Ventilating of Railroad Shops. J. I. Lyle. (65) Mar.  
 Electric Railways.\* H. M. Brinckerhoff. (14) Apr.  
 The Third Rail for High Speed Electric Service. Ernest Gonzenbach. (4) Apr.  
 A Caledonian Locomotive Giant.\* Charles Rous-Marten. (12) Apr. 3.  
 Great Eastern 3-Cylinder 10-Wheeled Coupled Tank Engine.\* (47) Apr. 4.  
 The Electrification of the Cincinnati, Georgetown & Portsmouth.\* E. M. Stevens. (15) Apr. 10; (40) Apr. 10.  
 Test Departments. C. W. Gennet, Jr. (15) Apr. 10.  
 Four Cylinder Compounds in Europe.\* Reginald Gordon. (15) Apr. 10.  
 Proposed Design of Locomotive Valves for High Speeds. J. V. N. Cheney. (15) Apr. 10.  
 Santa Fé Work on China Basin (San Francisco).\* (40) Apr. 10.  
 The Magnetic Traction Increaser. (40) Apr. 10.  
 The Columbus Shop Improvements.\* (15) Apr. 17; (18) Apr. 11.  
 The Transandine Railway.\* (18) Apr. 11.  
 A Novel Snow Locomotive.\* (46) Apr. 11.  
 Rock Island Consolidation (2-8-0) Locomotive.\* (15) Apr. 17.  
 The Cincinnati, Georgetown & Portsmouth Railroad.\* (14) Apr. 18.  
 New Erie Terminals at Jersey City and New York.\* (15) Apr. 24.  
 The Milan-Varese-Porto-Ceresio Electric Railway.\* (26) Apr. 24.  
 The General Arrangement of Railroad Repair Shops.\* (40) Apr. 24.  
 The Greater Wabash: A General Account of the New Construction Extending the Wabash to Pittsburgh and the Coast.\* (40) Apr. 24.  
 Rockford, Beloit & Janesville Railroad—Power Plant, Operation and Equipment.\* (17) Apr. 25.  
 The Locomotive Steel Frame and Its Repairs. A. W. McCaslin. (Paper presented before Ry. Club of Pittsburgh.) (18) Apr. 25.  
 The Great Eastern Railway "Decapod."\* James Holden, M. Inst. C. E. (10) May.  
 Railway Trains on Ferries: The Cross Channel Passage.\* Archibald S. Hurd. (10) May.  
 Steel Cars on the Bessemer & Lake Erie Railroad.\* (25) May.  
 Tandem Compound Freight Locomotive. New York Central and Hudson River Railroad.\* (25) May.  
 Freight Locomotive; Chicago, Rock Island & Pacific Railway.\* (30) May.  
 Automatic Block Signals, C. M. & St. P. Railway.\* W. H. Elliott. (40) May 1; (15) May 1.  
 Automatic Couplers on British Railways.\* T. A. Brockelbank. (20) May 1.  
 Extension of Clapham Junction Station; London & Southwestern Railway.\* (12) May 1.  
 Decapod Tank Locomotive for the Great Eastern Railway of England.\* (40) May 1.

\* Illustrated.





**Railroad—(Continued).**

- The Lackawanna Telephone System.\* (40) May 1.  
 Fort Wayne Shop Improvements.\* (15) May 1.  
 Frisco System Standard Roundhouse Arrangement.\* (18) May 2.  
 The Seattle Tacoma Interurban Railway.\* Howard S. Knowlton. (17) May 2.  
 The Manufacture and Properties of Hollow Pressed Steel Car Axles.\* Camille Mercader.  
 (Paper read before the Iron and Steel Inst.) (20) Serial beginning May 7; (40) May 8; (18) May 9; Abstract (13) May 7.  
 Developments in St. Louis Terminal Facilities.\* (18) May 9.  
 Gulf & Ship Island Ry. Shops.\* (18) May 9.  
 Note sur la Locomotive Compound à 4 Cylindres de la Compagnie des Chemins de Fer de Jura Simplon.\* Camille Barbey. (38) Apr.  
 Quadricycle et Wagonette à Pétrol pour la Circulation sur les Lignes de Chemins de Fer.\* L. Pierre Guédon. (33) Apr. 18.  
 Attelage Automatique des Wagons.\* G. Mareschal. (33) Apr. 25.  
 Étude sur les Freins. E. Billy and H. Noalhat. (36) Serial beginning Apr. 25.

**Railroad, Street.**

- Rapid Transit in New York. Robert P. Porter. (11) Apr. 10.  
 The East Boston Tunnel.\* (15) Apr. 10.  
 Car Shops of the Rochester Railway.\* (17) Apr. 11.  
 Ventilation of Street Cars.\* (17) Apr. 11.  
 Subway Structures of the Philadelphia Rapid Transit Company.\* (14) Apr. 18.  
 New Power Plans of the United Railways of San Francisco.\* (17) Apr. 18.  
 Subway and Elevated Construction in Philadelphia. (17) Apr. 18.  
 The Electrification of the Mersey Railway.\* (11) Apr. 24.  
 The Surface Contact Tramways at Wolverhampton.\* (12) Apr. 24.  
 Philadelphia Rapid Transit Plans.\* (15) Apr. 24.  
 Locomotion and Transport in London.\* Edward Davy Pain. (15) Apr. 24.  
 Ohio Central Traction System.\* (17) Apr. 25.  
 Working Drawings for an Electric Flat Car.\* Arthur B. Weeks. (17) Apr. 25.  
 The Construction of Semi Convertible Cars.\* (17) Apr. 25.  
 The Whitechapel and Bow Railway.\* (11) Serial beginning May 1.  
 Power Plant of the Worcester & Blackstone Valley Street Railway Company.\* (14) May 2.  
 Types of Car Tracks for City Streets.\* (14) May 2.  
 Conduit Construction in Brussels.\* (17) May 2.  
 Improvements in the Du Bois Electric & Traction System.\* (17) May 9.  
 Equipment of Yerkes' London Underground Railways.\* (17) May 9.  
 Noiseless Railway Crossings.\* (17) May 9.  
 Le Métropolitain de Paris.\* A. Dumas. (33) Serial beginning Mar. 28.  
 Le Chemin de Fer Métropolitain de Paris: Ligne Circulaire Nord par les Boulevards Extérieurs.\* Raymond Godfernaux. (38) Apr.

**Sanitary.**

- Sewer System for Indiana Harbor, Indiana.\* (14) Apr. 11.  
 The New Septic Tanks and Bacterial Contact Beds at Exeter, England.\* (13) Apr. 16.  
 Ventilation and Heating in Rockefeller Hall, Vassar College.\* (14) Apr. 25.  
 Excavations for Sewerage Purposes and Unaccounted for Gas: An Experience. E. G. Smithard. (Paper read before the Eastern Counties Gas Mgrs. Assoc.) (66) Apr. 28.  
 Ventilating and Heating in the New Government Building at San Francisco.\* (14) May 2.

**Structural.**

- On the use of Influence Lines in Graphic Statics.\* Myron S. Falk. (6) Jan.  
 Paint. Houston Lowe. (61) Mar.  
 Rock Asphalt and Asphalt Mastic. Henry Wiederhold. (2) Apr.  
 Apparatus for and Methods of Treating Wood, to Protect it from Fire and Preserve it from Decay. Joseph L. Ferrell. (2) Apr.  
 Manufacture of Cement from Marl and Clay.\* Henry S. Spackman. (2) Apr.  
 A Proposed New System of Building Retort-Houses. (66) Serial beginning Apr. 7.  
 A 165-Ft. Concrete Chimney.\* James D. Schuyler, M. Am. Soc. C. E. (14) Apr. 11.  
 Concrete Pile Foundations of the Hallenbeck Building, New York.\* (14) Apr. 11.  
 Comparative Tests of Limestone and Gravel Screenings and Torpedo Sand for Concrete. G. J. Griesenauer. (13) Apr. 16.  
 Official Report on Preservation of Structural Steel in a Tall New York Building.\* (14) Apr. 18.  
 Notes on the Treatment of Timber. S. W. Labrot. (18) Apr. 18.  
 The Dome Framing of the Chicago Post Office Building.\* (13) Apr. 23.  
 Recent Advances in the Standardization of Steel Specifications. (20) Apr. 30.  
 Portland Natural and Puzzolan Cements: An Introductory Paper. Edwin C. Eckel. (60) May.  
 Difficult Supports for Underpinning.\* (14) May 2.

**Topographical.**

- Notes on the Use of Stadia Lines in Surveying Instruments. H. Dennis Taylor. (11) Apr. 17.



**Water Supply.**

- Rainfall on the Pacific Coast of North and South America and the Factors of Water Supply in California. Marsden Manson. (1) Mar.
- A Norwegian Water Power Plant.\* Franz Köster. (27) Apr. 4.
- Water Tower, Westinghouse Works, Manchester.\* (12) Apr. 10.
- Six Niagara Power Installations under Way: A Million Horse Power to be Developed at Niagara Falls.\* Frank C. Perkins. (27) Apr. 11.
- The Marlborough Brook Filter Beds.\* Walter W. Patch. (13) Apr. 15.
- Mechanical Filter Plant of the East Jersey Water Co., Little Falls, N. J.\* (13) Apr. 16.
- The Pittsburg System of Water Purification.\* (40) Apr. 17.
- Further Investigations of Water Waste in New York City. (13) Apr. 9; (14) Apr. 18.
- Vancouver Transmission Plant.\* Wyatt H. Allen. (27) Apr. 18.
- A Water-Works Appraisal at Mobile, Ala. (13) Apr. 23.
- A Prony Brake Test of a Horizontal Turbine for the Bates Mfg. Co., Lewiston, Me.\* William O. Webber, M. Am. Soc. M. E. (13) Apr. 30.
- The Cost of Diamond Drill Borings in the Colorado River Valley and at St. Mary's Lake, Montana. A. P. Davis. (13) Apr. 30.
- The Cascade Water, Power and Light Co., Cascade, B. C., Canada. W. G. McConnon. (27) Apr. 25; (18) Apr. 25; (14) May 2.
- The Water Power Development at Chaudière Falls, P. Q.\* (13) May 7.
- The Wigwam Reservoir Masonry Dam of the Water-Works of Waterbury, Conn.\* R. A. Cairns, M. Am. Soc. C. E. (13) May 7.
- Recording Pressure Gauges as Aids in Water-Works Management. A. O. Doane. (14) May 9.
- Biological and Chemical Laboratories of the Water Department of New York City. George C. Whipple. (14) May 9.
- Note sur les Installations Hydro-Électriques de Rheinfelden, de Zurich et de Schwyz, en Suisse.\* G. Herman. (30) Apr.
- Le Laboratoire d'Hydraulique Fluviale de Carlsruhe.\* (35) Apr.
- Les Barrages d'Assouan et d'Assiout.\* (35) Serial beginning Apr.
- Les Eaux de Bruxelles en 1902. (36) Apr. 10.
- L'Épuration des Eaux par l'Ozonisation.\* Albert Reyner. (36) Apr. 25.

**Waterways.**

- Pittsburgh—Her Waterways and Her Railways. Antes Snyder. (58) Feb.
- Improved Waterway Necessary for Commercial Outlet (Pittsburgh). W. B. Rodgers. (58) Feb.
- Personal Experiences in the Construction of a Landing Pier for the Ocos Railway, Guatemala, C. A.\* Charles List. (1) Mar.
- Foundation for Coal Pocket at Lincoln Wharf, Boston Elevated Railway Co.\* Robert B. Davis, M. Am. Soc. C. E. (1) Mar.
- Methods and Costs of Pile Pulling and Pile Blasting.\* (13) Apr. 16.
- Tidal Waves, Seaquakes and Storm Waves. W. H. Wheeler, M. Inst. C. E. (12) Apr. 17.
- Damming the Niagara River at Buffalo.\* J. H. Massie. (14) Apr. 18.
- River Training in the Punjab.\* F. J. E. Spring. (Extracts from paper in *Indian Engineering*.) (18) Apr. 25.
- The Stewart River Gold Dredge.\* A. W. Robinson. (Paper read before the Canadian Mining Inst.) (68) Apr. 25; (16) May 2.
- The New 30-In. Hydraulic Dredge for the Port of Portland, Oregon.\* (13) Apr. 30.
- Electric Haulage on Canals.\* (26) May 1.
- English Shipping Appliances for Coal.\* (15) May 1.
- Note sur l'Amélioration de l'Embouchure du Rupel.\* Octave Mavant. (31) Part iv, 1902.
- Les Travaux de Rectification de l'Ourthe en Cours d'Exécution entre Chênée et Liège. Em. Jacquemin. (30) Apr.

\* Illustrated.



## AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1852.

## PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

## SOCIETY AFFAIRS.

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## MINUTES OF MEETINGS.

## OF THE SOCIETY.

**June 3d, 1903.**—The meeting was called to order at 8.45 p. m., President Noble in the chair; Chas. Warren Hunt, Secretary; and present, also, 99 members and 15 guests.

The minutes of the meetings of May 6th and 20th, 1903, were approved as printed in *Proceedings* for May, 1903.

A paper entitled "A New Safety Explosive," by Richard T. Dana, Assoc. M. Am. Soc. C. E., was presented by the author. The subject was discussed by A. McL. Parker, M. Am. Soc. C. E., and the author.

John F. Jackson, Assoc. M. Am. Soc. C. E., described informally the construction of some steel-faced dams recently built in the West.



Ballots for membership were canvassed, and the following candidates elected:

AS MEMBERS.

FRANK HOOKER ALFRED, Detroit, Mich.  
WILLARD LEWIS BOWKER, Portsmouth, N. H.  
EDWARD DU BOIS BROWN, New York City.  
CHARLES WALTER BRYAN, New York City.  
GEORGE CALBRAITH CLARKE, Pittsburg, Pa.  
LEWIS AUGUSTUS DUNHAM, Kansas City, Mo.  
JOHN MEIGGS EWEN, Chicago, Ill.  
STETSON GEORGE HINDES, San Francisco, Cal.  
FRANK CLIFTON KIMBALL, Knoxville, Tenn.  
CHARLES LIST, San Francisco, Cal.  
WILFRED GILLETTE McCONNEL, Guantanamo, Cuba.  
EDWARD FURBER MILLER, Newton Center, Mass.  
HENRY HOBART PORTER, Jr., New York City.  
GEORGE ROCKWELL PUTNAM, Manila, Philippine Islands.  
ROBERT RIDGWAY, New York City.  
JESSE SUPPLEE, Erie, Pa.  
INGVART TEILMAN, Fresno, Cal.  
THOMAS WILLIAM TOWNSEND TUCKEY, Tangku, North China.

AS ASSOCIATE MEMBERS.

DORSEY ASH, Salt Lake City, Utah.  
SHIRLEY BAKER, San Francisco, Cal.  
GEORGE HECKMAN BURGESS, Pittsburg, Pa.  
RICHARD GEORGE DOERFLING, San Francisco, Cal.  
JOHN TURNER FETHERSTON, New Brighton, N. Y.  
WILLIAM HAYDEN FORD, Philadelphia, Pa.  
CHARLES NEWTON GREEN, New York City.  
LOREN EDWARD HUNT, Berkeley, Cal.  
ARTHUR PRICE LAW, Bridgeport, Conn.  
THOMAS R LAWSON, Troy, N. Y.  
GEORGE STEVENS LEAVENWORTH, Fairmont, W. Va.  
JOHN BROWN LINDSEY, Jr., Talladega, Ala.  
GEORGE KERR LITTLE, Tuscaloosa, Ala.  
JOHN GRANT MACGREGOR, Louisville, Ky.  
CHARLES EPHRAIM MCCOY, Lowsville, W. Va.  
CASTLE PRENTICE MOSS, New Westminster, B. C., Canada.  
COLONE WILL JACKSON NEVILLE, Chicago, Ill.  
GEORGE VOLNEY RHINES, Toledo, Ohio.  
FELIX CHARLES STEHLE, Wissahickon, Pa.  
THOMAS CORWIN STRAWN, Hoboken, N. J.

ROBERT SWAN SUMNER, Alamogordo, N. Mex.  
 ARTHUR WARREN TIDD, New York City.  
 EMMANUEL LOUIS VERNIER, New York City.  
 IRVINE WATSON, Wheeling, W. Va.

The Secretary announced the election of the following candidates by the Board of Direction on June 2d, 1903:

AS ASSOCIATE.

JOHN MACGREGOR, Baltimore, Md.

AS JUNIORS.

WILLIAM BROKAW BAMFORD, Trenton, N. J.  
 MAX LEE CUNNINGHAM, Shawnee, Okla.  
 FREDERICK FISCHER PILLET, Mobile, Ala.  
 JACOB SCHMITT, Brooklyn, N. Y.  
 JESSE RUSSELL TAFT, Albany, N. Y.

The Secretary announced the following deaths:

BENJAMIN FRANKLIN JONES, elected Fellow June 1st, 1870; died May 19th, 1903.

HENRY GRANT MORSE, elected Member April 7th, 1880; died June 2d, 1903.

Adjourned.

**THIRTY-FIFTH ANNUAL CONVENTION, HELD AT ASHEVILLE,  
N. C., JUNE 9th, 10th, 11th and 12th, 1903.**

**Opening Session, Tuesday, June 9th, 1903.**—The meeting was called to order at 2.30 p. m., by J. L. Ludlow, M. Am. Soc. C. E., Chairman of the Local Committee.

The Chairman introduced General Theodore F. Davidson, who, in a brief speech, welcomed the Society to Asheville and the State of North Carolina.\*

The President, Alfred Noble, M. Am. Soc. C. E., after replying to the address of welcome, took the chair and opened the business meeting.

**BUSINESS MEETING.**

President Alfred Noble in the chair; Chas. Warren Hunt, Secretary.

The Secretary stated that, as it had been practically understood at previous business meetings that the Annual Convention of 1904 should be held at St. Louis during the Louisiana Purchase Exposition, the customary ballot, asking members to state their preferences as to the place of holding the Convention, had not been sent out.

In reference to holding the next Convention at St. Louis, the Secretary read letters of invitation from Messrs. D. R. Francis, President, Louisiana Purchase Exposition; C. P. Walbridge, President, Business Men's League; Rolla Wells, Mayor of St. Louis; and J. A. Ockerson, M. Am. Soc. C. E.†

On motion, duly seconded, the matter was referred to the Board of Direction with power.

The Secretary read the proposed amendment to the Constitution.‡

It was moved by J. J. R. Croes, Past-President, Am. Soc. C. E., that a third clause be added to Section 1 of Article III, as follows:

“All members other than Honorary Members and Juniors shall be admitted to the Society only by vote of the Corporate Members as hereinafter specified.”

The motion, being duly seconded, was carried.

Mr. Croes moved that the second paragraph of Section 3, Article III, be amended so as to read:

“The Board shall have the power to elect persons to the grade of Junior, and to transfer persons from any grade except that of Junior to a higher grade of membership, and shall notify the membership of its action.”

The motion, being duly seconded, was carried.

The Secretary presented a communication from James Burden,‡ Assoc. M. Am. Soc. C. E., relative to the age at which Juniors shall

\* See page 206.

† For copies of these letters see pages 210-211.

‡ See page 211.

§ See page 217.

cease to be connected with the Society; and, at Mr. Burden's request, offered as an amendment that the age be changed from thirty to thirty-five years, which was seconded.

As a further amendment, Henry B. Seaman moved that the age be fixed at thirty-two, which amendment was accepted by the Secretary, acting for Mr. Burden.

After discussion, the motion, being put, was carried.

The Secretary presented a letter from Samuel Whinery,\* M. Am. Soc. C. E., relating to the proposed amendment to the Constitution, and it was moved and seconded that the following paragraph be placed at the end of Section 4 of Article III:

"A rejected applicant may renew his application for membership at any time after the expiration of one year from the date of the ballot rejecting his previous application."

After discussion, the motion, being put, was carried. The President then announced that the proposed amendment as amended would be sent out for letter-ballot in accordance with the Constitution.

The proposed amendment, as amended, is as follows:

Amend the Constitution by striking out Sections 6, 7 and 8 of Article II, and the whole of Article III, and substituting therefor the following:

#### ARTICLE II.—MEMBERSHIP

\* \* \* \* \*

6.—A Junior shall not be less than eighteen years of age, and his connection with the Society shall cease when he becomes thirty-two years of age, unless he be previously transferred to another grade. He shall have had active practice in some branch of engineering for at least two years, or he shall have graduated from a school of engineering of recognized standing. Persons who are in the Junior class at the time of the adoption of this Constitution shall not have their status changed by the provisions of this section.

7.—Honorary Members shall be chosen only from persons of acknowledged eminence in some branch of engineering or the sciences related thereto. There shall not be more than twenty at any one time.

8.—Fellows shall be contributors to the permanent funds of the Society, though they may not be eligible for admission as Corporate Members.

#### ARTICLE III.—ADMISSIONS AND EXPULSIONS.

1.—Honorary Members shall be proposed by at least ten members, and shall be elected only by a unanimous vote of the Board

\* See page 219.

of Direction. A Past-President, or a member of the Board of Direction proposed for Honorary Membership, shall not be required to vote either for or against his own admission.

A person elected an Honorary Member shall be promptly notified thereof by letter. The election shall be cancelled if an acceptance is not received within six months after the mailing of such notice.

All members other than Honorary Members and Juniors shall be admitted to the Society only by vote of the Corporate Members, as hereinafter specified.

2.—An application for admission to the Society or for transfer from one grade to another shall embody a concise statement, with dates, of the candidate's professional training and experience; and shall be in a form and in such detail as may be prescribed by the Board of Direction. It shall be signed by the applicant, and shall contain a promise to conform to the requirements of membership, if elected. The applicant shall furnish the names of at least five Corporate Members to whom he is personally known. Each of these shall be requested by the Secretary to address a letter to the Board of Direction, on a form prescribed by said Board, stating the extent of the writer's personal knowledge of the applicant and of his professional work. If at least five of the Corporate Members named as references do not furnish the requisite endorsement, the Secretary shall call upon the applicant for additional names, and not until written communications shall have been received from at least five Corporate Members shall the application be considered by the Board.

Applications of engineers not resident in North America, and who may be so situated as not to be personally known to five Corporate Members, may be recommended for ballot by five members of the Board of Direction, after having secured evidence sufficient, in their opinion, to show that the applicant is worthy of admission.

3.—At stated periods, to be determined by the Board of Direction, there shall be issued to each member in any grade whose address is known, a list of all new applications received for admission or for transfer, which list shall be dated and shall contain a concise statement of the record of each applicant and the names of his references, with a request that members transmit to the Board any information in their possession which may affect the disposition of the applications. Not less than twenty days after the issue of such list, the Board of Direction shall consider these applications, together with any information in regard to the applicants that may have been received; may make further inquiries, if deemed expedient; shall classify the applicant with his consent, and on application for admission may direct a ballot.



The Board shall have the power to elect persons to the grade of Junior, and to transfer persons from any grade except that of Junior to a higher grade of membership, and shall notify the membership of its action.

4.—The ballots shall be letter-ballots, in a form to be prescribed by the Board of Direction. They shall be mailed to each Corporate Member whose address is known, and shall state the date on which the ballot is to be canvassed, which shall be not less than twenty days after the issue of the ballot. Twenty or more negative votes shall exclude from election. In case of exclusion, no notice thereof shall be entered on the minutes, but the candidate shall be notified.

A rejected applicant may renew his application for membership at any time after the expiration of one year from the date of the ballot rejecting his previous application.

5.—All elected candidates shall be duly notified and shall subscribe to the Constitution and Rules of the Society. Forms for these purposes shall be prescribed by the Board of Direction. If these provisions are not complied with within six months from the notification of election, such election shall be considered void, unless for special reason the time shall be extended by the Board of Direction.

Membership of any person shall date from the day of his election.

6.—Upon the written request of ten or more Corporate Members, that for cause therein set forth a person belonging to the Society be expelled, the Board of Direction shall consider the matter, and if there appears to be sufficient reason, shall advise the accused of the charges against him. He may, if he so desires, present a written defence which shall be considered at a meeting of the Board of Direction, of which he shall receive due notice. Not less than two months after such meeting, the Board of Direction shall finally consider the case, and if resignation has not been tendered, or a defence made which is satisfactory to the Board, it shall then notify the person that he will be expelled in one month, unless he elects to appeal from this decision. Appeals will be submitted to the Corporate Members by letter-ballot in a form to be prescribed by the Board of Direction. The ballot shall be accompanied by a statement of the charges, and of the action of the Board thereon, with such information as it deems proper, and also the statement of the person making the appeal. The ballot shall be canvassed by the Board not less than twenty days after its issue. A majority of the ballots cast will be required to sustain the action of the Board. The Board will notify the person and the Corporate Members of the result of the ballot. In case no appeal be made, the Board of Direction will expel

the person, and notify him and the Corporate Members of its action.

7.—A member of any grade in the Society may resign his membership by a written communication to the Secretary, who shall present the same to the Board of Direction; when, if all his dues have been paid, his resignation shall be accepted.

8.—All persons elected and duly qualified, whose address on the records of the Society is within fifty miles of the Post Office in the City of New York, shall be deemed Resident; and those whose address is beyond that limit shall be deemed Non-Resident.

The classification of each person for the fiscal year as Resident or Non-Resident, shall be determined by the Records of the Society as they may appear on January 1st of that year.

The Secretary presented a brief outline of the inception and history of the proposed co-operation of the Society with other National Societies and the Engineers' Club of New York in the erection of an Engineering Building; and also read the resolutions framed by the Board of Direction for presentation to the Society at the Convention.\*

G. W. Catt, M. Am. Soc. C. E., moved the adoption of the resolutions. The motion was seconded. The subject was then discussed.

At 5.50 P. M., adjourned to Wednesday, June 10th, 1903, at 9 A. M.

#### BUSINESS MEETING—(*Continued.*)

The meeting was called to order at 9.45 A. M., President Alfred Noble in the chair; Chas. Warren Hunt, Secretary.

The discussion on a proposed Joint Engineering Building was resumed.

The following motion, offered by H. S. Haines, M. Am. Soc. C. E., was seconded by Charles Hansel, M. Am. Soc. C. E.

"It is the sense of this meeting that the letter-ballot called for in the resolutions should be presented to the Society with the usual sixty days' notice and opportunity for discussion in business meeting."

After discussion, George S. Davison, M. Am. Soc. C. E., moved in amendment that the words "at the next Annual Meeting" be substituted for the words "in business meeting."

This amendment, being duly seconded, was carried.

B. M. Harrod, Past-President, Am. Soc. C. E., moved that the resolutions offered by the Board of Direction be amended as follows: Add to the third resolution the following:

"And also to make such investigations and hold such conferences as may bear upon the advisability of the acceptance of Mr. Carnegie's proposition by this Society."

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\* See page 226.

Also insert, in the fifth resolution, after the words "can be obtained," the following words, "and that the acceptance of the proposition is otherwise practicable."

The motion, being duly seconded, was carried.

The resolutions as amended and adopted are as follows:

"*Whereas*, The resolutions submitted by the Joint Conference Committee in the matter of the Proposed Union Engineering Building are not in suitable form, in the opinion of the Board of Direction of the American Society of Civil Engineers, to be submitted to the Society:

"*Resolved*, That it is the sense of this Board that the proposition, when submitted to the Society, should make definite provision for the accommodations necessary for the present and future needs of the several organizations, and that the proportion of the total expense to be borne by each of the organizations concerned should be definitely stated, and be it further

"*Resolved*, That the Board of Direction recommends, to the Business Meeting to be held at the Annual Convention, the adoption of the following resolutions:

"*Resolved*, That the Board of Direction be authorized to ascertain whether suitable accommodations can be obtained for the Society in the proposed new building, with provisions for future needs, and also to make such investigations and hold such conferences as may bear upon the advisability of the acceptance of Mr. Carnegie's proposition by this Society.

"*Resolved*, That the Board of Direction be authorized to co-operate to this end with the other organizations concerned.

"*Resolved*, That the Board of Direction be requested, provided it is satisfied that suitable accommodations can be obtained, and that the acceptance of the proposition is otherwise practicable, to send to the members of the Society a letter-ballot by means of which a direct expression of the wishes of the Society in the matter may be secured, and to accompany such ballot by a statement of reasons for and against uniting in the scheme with the other organizations.

"*Resolved*, That the Board of Direction, in case a majority of the members, as shown by letter-ballot, are in favor of uniting with the other organizations, is authorized to proceed in behalf of the Society in carrying out the project."

The following resolution was then offered by Mr. Hansel:

"*Resolved*, That the American Society of Civil Engineers acknowledge the offer from Mr. Carnegie, and thank him sincerely for the opportunity, and advise him at the same time of the action to-day, and that the object of this delay is to determine and consider every feature of the situation carefully before deciding the matter."

The motion, being duly seconded, was carried.

After certain announcements relative to the programme had been made, the Business Meeting adjourned.

**Second Session, Tuesday, June 9th, 1903, 8 P. M.**—The meeting was called to order at 8 P. M., President Alfred Noble in the Chair; Chas. Warren Hunt, Secretary.

The President delivered the Annual Address.

**Third Session, Wednesday, June 10th, 1903.**—At the close of the Business Meeting the discussion of Engineering Topics was taken up.

Discussion on the first topic, "Timber Tests," was opened by W. K. HATT, Assoc. M. Am. Soc. C. E., on behalf of the United States Bureau of Forestry. Written discussions by Messrs. Gaetano Lanza and H. von Schrenk were not read, owing to the lateness of the hour. The topic was further discussed by the following:

A. L. JOHNSON, M. Am. Soc. C. E.

S. BENT RUSSELL, M. Am. Soc. C. E.

The meeting then took up the discussion of the second topic, as follows:

"Sewage Purification."

The subject was opened by a written discussion from RUDOLPH HERING, M. Am. Soc. C. E., presented by the Secretary.

Adjourned.

**Fourth Session, Thursday, June 11th, 1903.**—The meeting was called to order at 9.20 A. M., President Alfred Noble in the chair; Chas. Warren Hunt, Secretary.

The President introduced the Hon. Charles B. Aycock, Governor of North Carolina, who spoke as follows:

Ladies and Gentlemen: The suggestion of your President, that I address you this morning, takes me by surprise. I am not going to do that. I wish it had been my good fortune or that I had fitting occasion to have had the opportunity of expressing to you, in behalf of North Carolina, our appreciation of your coming among us. The good fortune of doing that rested with my good friend, General Davidson. What he has once done no man can do better, and I will not attempt, again, to put into fitting phrase the cordial welcome which all North Carolina extends to you. We are glad to have you with us. We take it as an honor that this learned Society should meet in our midst, and we know that we will find profit in your deliberations.

Now, I do not know anything about the work which you all do. There are some things, however, which it has been my observation that you have not yet accomplished, and to which I hope you will give your attention. In all your studies I hope that you will have in view that great body among whom I am a small particle, the consumers, and that you will be able in the future to unravel the mystery which controls the gas, water and electric meters, and I commend, Mr. President, to your most careful consideration, the study of the operation of a water meter which continues running long after the water has been shut off. I believe the old song tells us that the wheel is not driven by the water that has passed,



but that is the water that we see on the outside; it continues to run on the inside (laughter). And when you have accomplished that purpose, why, we shall owe you a debt of gratitude that we can never repay.

But your deliberations are of value. They are of value to all the world. You have been of great service to this country as have the representatives of your great association in our State. There is no man whom we esteem more than your representative, Mr. Ludlow, who has been instrumental in bringing you here, and he, I am sure, has added to your comfort and pleasure. Again, I wish to express to you my appreciation of your coming among us, to express the hope that you will stay a long time, and to assure you that the longer you stay, the better we shall like you.

The Governor of this State is clothed with ample power to pardon you for any offense that you may want to commit. (Laughter and applause.) It has not been the custom of North Carolina governors to issue pardons in advance, but, looking into your faces, I promise you now to pardon you for any offense which any one of you may commit while within our borders; with one single exception, however, and that is, if you should leave us without regarding Asheville as the finest place in the universe, without regarding North Carolina as the best State in the Union, without wanting to come back and stay with us and be with us again—for that I cannot pardon you; (applause) for this is a beautiful section, and when you have seen Asheville, any Ashevillean will tell you that you have seen North Carolina, but North Carolina extends one hundred miles to the west of here and five hundred miles to the east. If you were to swing this good State of ours on Murphy as a pivot—Murphy lies one hundred and twenty miles west of here—Chocowinity, on our eastern coast, would rest on the spot that Chicago now tries to fill. (Laughter and applause.)

This is a State that we are very proud of, and we want you to know more about it. We are proud of her history, and would you regard it as offensive in me if I reminded you just for a moment of some of the history of which we are proud?

This State of ours was the first colony that was settled. The colonization was not a success, but we were colonized at first under the auspices of that great and good man, Sir Walter Raleigh, and we have named the capital of our State for him, not for his great achievements, understand, not for his wonderful learning, not for his statesmanship, not for his seamaanship, but we have named the capital of this State in his honor for one simple little act, for we read in history that that great man, when he saw his queen about to wet her feet, dropped the rich cloak from his shoulders in order that she might walk dryshod across; (applause) and it is in memory of that deed, in the love of the woman, that we have named our capital after him.



It was this good State of ours that had the first Tea Party that was held in the Colonies. The Tea Party at Boston has been celebrated in song, in history, in romance, but the North Carolina Tea Party at Edenton, when the North Carolina Colonial Dames resolved that they would drink no more tea as long as the hated tax remained on it, is known to few outside of the borders of this State. And we had another Tea Party down on Cape Fear, three or four hundred miles from here, a Tea Party in which the men of old Cape Fear, in the broad open daylight, in the presence of the Royal Governor, took the stamp clerk and swore him that he would bring no more stamps into the Colony of North Carolina forever.

It was in this State of ours that the first victory was won in behalf of America—the battle of Moore's Creek, in Pender County. It was in this State of ours that the first Declaration of Independence was ever written; the Mecklenburg Declaration of Independence of the 20th of May, 1775. So that we are glad to welcome you to this historic place.

Along the lines of industrial activity, along the lines of commerce, along business lines, we have not kept pace with other States, but we have caught the step, and the future in this State shall furnish opportunities to men of your profession, and your profession will make us successful in many of the departments of life.

Again I greet you and thank you for the opportunity of looking into your faces and gathering further and renewed hope for North Carolina in the work which you do. (Applause.)

At the conclusion of the address, B. M. Harrod, Past-President, Am. Soc. C. E., opened the discussion of the third topic:

“In the Treatment of the Mississippi River, is the Levee Theory Justified by Experience?”

The Secretary read a communication on the subject from J. A. Ockerson, M. Am. Soc. C. E., and Samuel Tobias Wagner, M. Am. Soc. C. E., presented briefly the views of Lewis M. Haupt, M. Am. Soc. C. E.

Owing to lack of time the written discussion of L. W. Brown, M. Am. Soc. C. E., was not read.

The meeting then took up the discussion of the topic:

“Is it possible to make Concrete which will be Impervious to Water? If so, what is the best method?”

The subject was discussed by the following:

R. W. LESLEY, Assoc. Am. Soc. C. E.

J. J. R. CROES, Past-President, Am. Soc. C. E.

J. W. SCHAUB, M. Am. Soc. C. E.

B. R. GREEN, M. Am. Soc. C. E.

O. LOWINSON, Assoc. M. Am. Soc. C. E.

W. K. HATT, Assoc. M. Am. Soc. C. E.

The Secretary read a communication on the subject from Mr. Edward Cunningham.

It was moved by J. W. Schaub, M. Am. Soc. C. E., that it is the sense of this meeting that a Special Committee be appointed to take up the question of concrete and steel-concrete, and that such committee co-operate with the Association for Testing Materials, and the Railway Engineers' Maintenance of Way Association, which also have a committee on this subject.

The motion, being duly seconded, was carried.

The next topic discussed was:

“In View of the Increasing weights of Rolling Stock, for what loadings should Railroad Bridges be designed?”

The discussion was opened by a communication from H. W. Hodge, M. Am. Soc. C. E., read by the Secretary; and was added to by the following:

J. W. SCHAUB, M. Am. Soc. C. E.

E. SWENSSON, M. Am. Soc. C. E.

T. L. CONDRON, M. Am. Soc. C. E.

It was moved by George W. Catt, M. Am. Soc. C. E., and seconded by B. R. Green, M. Am. Soc. C. E., that a committee be appointed to draft a series of resolutions of thanks to the several parties who have kindly entertained the Society at Asheville.

The motion was carried, and the President appointed Messrs. George W. Catt, H. S. Haines and B. R. Green.

Adjourned.

The following resolutions were prepared by the Committee and have been transmitted in accordance with the action of the Convention:

“*Whereas*, The Thirty-fifth Annual Convention of the American Society of Civil Engineers, at Asheville, N. C., June 9th-12th, 1903, will long be remembered by those who were fortunate enough to be present, as a most delightful social occasion.

“*Resolved*, That the thanks of the Society are hereby heartily tendered to the Local Committee of Arrangements, and particularly to its Chairman, J. L. Ludlow, M. Am. Soc. C. E., for the careful preparation, and successful carrying out, of the attractive programme.”

“*Resolved*, That the thanks of the American Society of Civil Engineers are hereby cordially tendered to the Swannanoa Country Club, for courteously placing its interesting Golf Links at the disposal of the members and guests of the Society during the Thirty-fifth Annual Convention of the Society, June 9th-12th, 1903, and for hospitably throwing open its Club House to all who attended the Convention.”

“*Resolved*, That the thanks of the American Society of Civil Engineers are hereby cordially tendered to the Asheville Club for courtesies extended to its members during the Thirty-fifth Annual Convention of the Society, June 9th-12th, 1903.”

*“Resolved, That the thanks of the American Society of Civil Engineers are hereby heartily tendered to W. F. Randolph, Esq., Secretary, Asheville Board of Trade, for his energetic efforts to add to the pleasure and comfort of all who attended the Convention, which were entirely successful, and very much appreciated.”*

*“Resolved, That the thanks of the American Society of Civil Engineers are hereby tendered to the Asheville Electric Company for many courtesies extended to its members and guests on the occasion of its Thirty-fifth Annual Convention, June 9th-12th, 1903.”*

*“Resolved, That the thanks of the American Society of Civil Engineers, and particularly of those who were so fortunate as to be present on the occasion referred to, are hereby tendered to Richard S. Howland, Esq., for the courtesy of his invitation to visit Overlook Park on Sunset Mountain, on June 11th, 1903, as well as for the hospitable ‘Barbecue’ which added so much to the pleasure and comfort of that occasion.”*

## OF THE BOARD OF DIRECTION.

(Abstract.)

**June 2d, 1903.**—8.40 P. M.—President Noble in the Chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Briggs, Craven, Croes, Knap, Kuichling, Meade, Pegram, Schneider, Swain and Wilgus.

The thanks of the Board of Direction of the Society were voted to Charles Paine, Past-President, Am. Soc. C. E., for the presentation, in accordance with the request of the Board of Direction, of an oil painting of himself.

A report was received from the Committee appointed to attend the meetings of a Joint Conference Committee from other societies, and the Engineers' Club, presenting certain resolutions for the consideration of the Society.\*

Resolutions for presentation to the Business Meeting of the Annual Convention were adopted †

Applications were considered and other routine business transacted.

One candidate for admission as Associate, and five as Juniors were elected.‡

Adjourned.

**June 9th, 1903.**—The meeting of the Board, as required by the Constitution, was called at 9.30 P. M.

There were present Messrs. Noble, McDonald, Osborn, Pegram, Schneider and Hunt.

Inasmuch as a quorum of the Board at meetings convened at Annual Conventions is nine, no quorum being present, the meeting adjourned.

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\* See page 224.

† See page 226.

‡ See page 193.

**REPORT IN FULL OF THE FIRST SESSION OF THE THIRTY-FIFTH ANNUAL CONVENTION, INCLUDING THE BUSINESS MEETING, HELD AT THE BATTERY PARK HOTEL, ASHEVILLE, N. C.**

**Tuesday, June 9th, 1903.**

The meeting was called to order at 2.30 p. m. by J. L. Ludlow, M. Am. Soc. C. E., Chairman of the Local Committee.

Address of  
Welcome,  
J. L. Ludlow.

J. L. LUDLOW, M. Am. Soc. C. E.—Ladies and Gentlemen: As Chairman of the Local Committee of Arrangements, I have been allotted the privilege and pleasure of opening this, the Thirty-fifth Annual Convention of the American Society of Civil Engineers in the State of North Carolina. As a privilege, it is one that I appreciate highly; as a pleasure, it is one, the appreciation of which it is impossible for me to express. Not only words would fail me, but all the theorems, the formulas, the figures, ever thought of, conceived or used by the minds of those devoted to the art and science of engineering would not be able to express to you the pleasure that I feel in the honor which is thus conferred upon me. (Applause.)

Of North Carolina, the hospitality of which is as ancient as—well, say the Pyramids of Egypt—as unbounded as the atmosphere and the skies above us, as an adopted son, I would gladly address you, but of that it is not my privilege at this time to speak. I may, however, express one thought to prove my assertion of the limitless hospitality of North Carolina by reminding you, that when Fate decreed the most suitable birthplace for the first white child of America—the place that should be honored of all the American continent—Roanoke Island, in North Carolina, where even the Indians were found to be hospitable and kind, was the birthplace of Virginia Dare.

I have the honor of presenting to you one whose oratory and brilliant attainments are well known; a gentleman native and to the manner born, a typical North Carolinian who has been highly honored by his State, and returns a full measure of honor to her; one who exemplifies a lofty type of manhood in full harmony with the summits of Nature which surround us in this beautiful mountain region, that is so fittingly called the “Land of the Sky.” He will speak to you a hearty welcome to the State of North Carolina and to the City of Asheville. I have the honor to present General Theodore F. Davidson. (Applause.)

Address of  
Welcome,  
Gen. Davidson.

GEN. THEODORE F. DAVIDSON.—Mr. President, Ladies and Gentlemen: Should any of you have come here expecting to hear an oratorical display from me, or should any of you have been encouraged in an expectation, not very well formed beforehand, by what my friend, Mr. Ludlow, has said, I am sure that you will meet with a very serious disappointment.

It has been Asheville's good fortune to receive and entertain, Mr. President, many distinguished men, associations and societies, repre-



senting almost every phase of the intellectual, the moral, the political, the scientific and industrial life and progress of this most marvelous age. I think I can say to you this afternoon truthfully, Mr. President, that no occasion has been more fruitful of pleasant anticipations, no event has excited greater interest, with a very large portion of this community, than the convention in Asheville of the American Society of Civil Engineers.

We recognize and appreciate the high privilege of having with us one of the most learned and famous scientific societies of the world; perhaps, I am told, and I have no doubt it is true, there is but one other organization, purely scientific, in the world, which compares with it in importance and in achievement; a society whose membership represents, not only the Western Hemisphere, but which has its representatives wherever Christendom prevails; whose influence encircles the whole globe, whose genius and achievements are visible in every land and upon every sea.

It is the peculiar fortune, Mr. President, of your profession—the exceptional distinction of the science of engineering in its broadest sense—that in every period, at every stage of the progress of mankind, from savage conditions to civilization, it has been the most potent factor and agent; and what is especially fortunate for you is that it has been able to perpetuate its history and its influence by the creations of its genius, so great and so enduring that they are universally recognized as the mile-stones of history. If the literature, the political policy, the social and intellectual organizations of the ancient civilizations are either entirely lost to us or so veiled by the dust of centuries as to be fabulous, the engineer of the time of the Pharaohs gave us the Pyramids, and it has come to pass here to-day that our debt to the Pyramids is very much greater than scientific, for they are admirable for the purpose of reference on occasions of this sort. (Applause.) The enduring evidence of skill in the science of construction, the splendid remains of the cities of Asia, of the wonderful irrigating systems of China—even of the semi-civilized Peruvians—the construction of artificial ports for the advancement and protection of commerce as at Ostia and Piræus, Alexandria, Carthage, and all along the shores and the islands of the Mediterranean—the wonderful examples of the science of fortification at Syracuse, ascribed, I believe, to Archimedes; the highways and aqueducts of immortal Rome; the unapproachable beauty and glory of St. Peter's dome and Florence's Campanile, are the enduring illustrations and records of your profession in the past.

It has been said, I believe, that so far had your predecessors pushed the development of your science at the close of the eighteenth century that the opportunities for its further advancement and exploitation had reached a conclusion, and there were no fresh fields to explore or opportunities for new applications of principles of

Address of  
Welcome  
(continued).

engineering. However that may have been, with the discovery of steam as a motive power, a new, a vast and as yet only partly occupied field for the employment and advancement of the science of engineering was displayed. How quickly that opportunity was seized, how generously and magnificently it has been utilized, how great have been the blessings you have been able to confer upon your age need no recital now; we have but to look around us to see them in every direction. We take no step, individually or collectively, but we feel their benign influences. Most truthfully has it been said that the mission and achievements of the engineer are the subjection and control of the forces of Nature to the uses and happiness of mankind.

The traveler who is carried safely and comfortably for miles under the Alps; who is transported with equal comfort and safety through the air across the yawning chasm of Niagara, or the turbulent tides of the Forth; the merchant who securely floats his valuable cargoes through the Suez Canal, or the Mississippi Jetties; or harbors them in the great docks of London, Liverpool, Antwerp, Bremen, Marseilles, or New York; the mariner who now confidently navigates every sea and finds on every dangerous shore ever-vigilant sentinels against danger, as well as the most careful provision for his comfort and safety—all are either the conscious or unconscious beneficiaries or the thankful beneficiaries of your professional skill.

It would be an impossible task for me, with unlimited time at my command, to portray as they should be portrayed your efficient labors in the various avenues of our modern domestic, social and industrial life. You pierce the clouds and the skies with the sky-scrapers devoted to commerce and domestic life. If you cannot fling your spans of bridges across the Hudson you can ignore that stream by tunneling beneath it and connecting states, empires and nations without trouble from the intervention of natural obstacles. In the way of hygiene, sanitation, municipal development and all the agencies which go to evolve and bring under subjection the natural resources, not only of this new continent, but of the old, you are the pioneers and will ever be the pioneers necessarily, because it is the necessary incident to the practice of your profession.

Your past, at least, is secure. Your future I believe to be more brilliant, to be fuller of the possibilities of greater scientific development and usefulness to the world. On this continent, not to mention other things, you are now to assume the gigantic work of the construction of an isthmian canal, with all its vast and incomprehensible consequences, to commerce, to policies and to peoples; you are called upon as Americans representing the American Society of Civil Engineers to take up the great work of reclaiming a vast area of our country, an arid area, from the desert of desolation, and make it the valley of untold productivity. The possibilities of the uses of electricity lie just

before you, without it being in the ken of man to say what shall be the limits of those possibilities. The world waits upon you; you will ever be in the forefront, we are confident, in the future as in the past, of every movement for the advancement of knowledge, the progress of civilization and the happiness of mankind.

You will understand, therefore, Mr. President, and Ladies and Gentlemen, why we, the citizens of North Carolina, and especially of this little city in the mountains, welcome your coming with unusual interest, and I can only say in behalf of those people, and express the hope that the pleasure and profit we derive from your coming together here now will, in some degree, approach the feeling of thankfulness that the citizens of Asheville and of the State of North Carolina, I may add, entertain for the very great honor that you have done them in your coming together here, and, to quote the language that old Colonel Buncombe, for whom this County was named, inscribed upon his mansion in eastern North Carolina in the colonial days, "To Buncombe Hall, Welcome All." (Applause.)

ALFRED NOBLE, President, Am. Soc. C. E.—General Davidson, I accept, on behalf of the American Society of Civil Engineers, the most gracious welcome which you have accorded us. Our anticipations have been raised very high by the eloquence of our member, Mr. Ludlow, as he sought in glowing words to depict the attractions of this city in the mountains. For your hearty welcome we can only return our most fervent thanks. We appreciate very gratefully the kind words that you have been pleased to express in regard to our chosen profession, and if we may not reach the high ideals which you have placed for us, we must never forget that we must strive to come as near them as possible. With the sincerest thanks, General Davidson, we receive your welcome in a spirit no less cordial than that in which you have expressed it. (Applause.)

### BUSINESS MEETING.

President Noble in the chair; Charles Warren Hunt, Secretary.

THE PRESIDENT.—The Society will now come to order for its regular business meeting. The first question before the Society is the time and place for holding the next Annual Convention.

THE SECRETARY.—It having been practically understood at previous business meetings that the Convention of 1904 should be held in St. Louis during the Louisiana Purchase Exposition, the customary ballot was not sent out this year to members asking their preferences as to where the Convention should be held. It has been customary in the past that a discussion of the time and place for holding the next Annual Convention should take place each year at the Annual Convention. The usual course has been to express the views of the business meeting, and then to refer the matter with power to the Board of Direction.

I have, in that connection, Mr. President, received some letters in regard to St. Louis.

THE PRESIDENT.—The Secretary will read them, if there is no objection.

Letter from  
D. R. Francis.

THE SECRETARY.—I will read a letter addressed to the President of the Society, dated May 15th, by Mr. D. R. Francis, President:

“ST. LOUIS, U. S. A., May 15, 1903.

“*To the President of the  
American Society of Civil Engineers,*

“SIR:—

“On behalf of the Louisiana Purchase Exposition I desire to extend to the American Society of Civil Engineers a cordial invitation to hold the annual meeting of the Society for 1904, in the City of Saint Louis.

“In that year will be held at Saint Louis the Universal Exposition in commemoration of the one hundredth anniversary of the Purchase of Louisiana Territory. The Exposition management will be prepared to furnish without charge a satisfactory hall, for the holding of the sessions of the Society. The Committee on Ceremonies will, if desired, recognize the presence of the American Society of Civil Engineers by setting apart a special day, or by providing some distinctive feature of the program.

“The Information Service, conducted without charge by the Exposition management, will assist delegates in obtaining satisfactory accommodations at reasonable prices. The fair name of Saint Louis for hospitality will not be marred in 1904. Assurances given by the railroads warrant the promise of very low rates of transportation.

“Respectfully,

“D. R. FRANCIS,  
“*President.*”

Letter from  
C. P.  
Walbridge.

Also a letter dated May 18th, from the Business Men's League, C. P. Walbridge, President:

“ST. LOUIS, May 18, 1903.

“*To the President of  
The American Society of Civil Engineers,  
In Session at Asheville, N. C.*

“SIR:—

“The Business Men's League of St. Louis has the honor to extend an invitation to the American Society of Civil Engineers to hold its Convention in 1904 in St. Louis. The great Louisiana Purchase Exposition will then be open, and the city will be most attractive. The hotel and hall accommodations will be adequate, and railway rates will be low.

“Very truly yours,

“C. P. WALBRIDGE,  
“*President.*”

“WM. FLEWELLYN SAUNDERS,  
“*Secretary and General Manager.*”

Letter from  
Rolla Wells.

Also a letter from the Mayor of St. Louis:

“ST. LOUIS, May 20, 1903.

“*To the Honorable President and Members of  
The American Society of Civil Engineers,  
Asheville, N. C.*

“GENTLEMEN:—

“In behalf of the City of St. Louis, I take pleasure in extending to your Society a cordial invitation to hold your annual meeting for the year 1904, in this city.

“Very truly,

“ROLLA WELLS,  
“*Mayor.*”



Also a letter dated May 22d, addressed to the President, by the local members of the American Society of Civil Engineers, and by J. A. Ockerson, a member of this Society: Letter from J. A. Ockerson.

“ ST. LOUIS, MO., May 22, 1903.

“ MR. ALFRED NOBLE,

*President, American Society of Civil Engineers.*

“ DEAR SIR:—

“ At a recent meeting of the local members of the American Society of Civil Engineers, also at a meeting of the St. Louis Engineers' Club, I was requested to extend, in their behalf, a most cordial invitation to the American Society of Civil Engineers to hold its Annual Convention of 1904 in this city, and I now take great pleasure in doing so.

“ In addition to these invitations, I enclose herewith invitations from the Business Men's League, the Mayor of the City, and the President of the Louisiana Purchase Exposition.

“ It is something more than twenty-three years since the Society met in this city, and it is believed that the celebration of the anniversary of the Louisiana Purchase, by a Universal Exposition next year, will make this city particularly attractive as a meeting place. It is hoped, therefore, that these invitations will be presented to the Society at the next Annual Convention and receive favorable consideration.

“ Yours very respectfully,

“ J. A. OCKERSON,

“ *M. Am. Soc. C. E.*”

THE PRESIDENT.—The subject is now before the Convention.

HENRY B. SEAMAN, M. Am. Soc. C. E.—Mr. President, the discussion of the subject hardly seems necessary, as the Secretary says it has been previously under discussion, and I move that the matter be referred to the Board of Direction, with power to act.

The motion was seconded and carried.

THE PRESIDENT.—The next subject before the Convention is the proposed Amendment to the Constitution, which the Secretary will read.

The Secretary presented the amendment, as follows:

Amend the Constitution by striking out Sections 6, 7 and 8 of Article II, and the whole of Article III, and substituting therefor the following: Amendment to the Constitution.

#### ARTICLE II.—MEMBERSHIP.

\* \* \* \* \*

6.—A Junior shall not be less than eighteen years of age, and his connection with the Society shall cease when he becomes thirty years of age, unless he be previously transferred to another grade. He shall have had active practice in some branch of engineering for at least two years, or he shall have graduated from a school of engineering of recognized standing. Persons who are in the Junior class at the time of the adoption of this Constitu-



Amendment to  
the Constitu-  
tion  
(continued).

tion shall not have their status changed by the provisions of this section.

7.—Honorary Members shall be chosen only from persons of acknowledged eminence in some branch of engineering or the sciences related thereto. There shall not be more than twenty at any one time.

8.—Fellows shall be contributors to the permanent funds of the Society, though they may not be eligible for admission as Corporate Members.

### ARTICLE III.—ADMISSIONS AND EXPULSIONS.

1.—Honorary Members shall be proposed by at least ten members, and shall be elected only by a unanimous vote of the Board of Direction. A Past-President, or a member of the Board of Direction proposed for Honorary Membership, shall not be required to vote either for or against his own admission.

A person elected an Honorary Member shall be promptly notified thereof by letter. The election shall be cancelled if an acceptance is not received within six months after the mailing of such notice.

2.—An application for admission to the Society or for transfer from one grade to another shall embody a concise statement, with dates, of the candidate's professional training and experience; and shall be in a form and in such detail as may be prescribed by the Board of Direction. It shall be signed by the applicant, and shall contain a promise to conform to the requirements of membership, if elected. The applicant shall furnish the names of at least five Corporate Members to whom he is personally known. Each of these shall be requested by the Secretary to address a letter to the Board of Direction, on a form prescribed by said Board, stating the extent of the writer's personal knowledge of the applicant and of his professional work. If at least five of the Corporate Members named as references do not furnish the requisite endorsement, the Secretary shall call upon the applicant for additional names, and not until written communications shall have been received from at least five Corporate Members shall the application be considered by the Board.

Applications of engineers not resident in North America, and who may be so situated as not to be personally known to five Corporate Members, may be recommended for ballot by five members of the Board of Direction, after having secured evidence sufficient, in their opinion, to show that the applicant is worthy of admission.

3.—At stated periods, to be determined by the Board of Direction, there shall be issued to each member in any grade whose address is known, a list of all new applications received for admission or for transfer, which list shall be dated and shall contain a concise statement of the record of each applicant and the names of his references, with a request that members transmit to the Board any information in their possession which may affect the disposition of the applications. Not less than twenty days after the issue of such list, the Board of Direction shall consider these applications, together with any information in regard to the applicants that may have been received; may make further inquiries,

if deemed expedient; shall classify the applicant with his consent, and on applications for admission may direct a ballot.

The Board shall have the power to transfer persons from a lower to a higher grade of membership, and shall notify the membership of its action.

4.—The ballots shall be letter-ballots, in a form to be prescribed by the Board of Direction. They shall be mailed to each Corporate Member whose address is known, and shall state the date on which the ballot is to be canvassed, which shall be not less than twenty days after the issue of the ballot. Twenty or more negative votes shall exclude from election. In case of exclusion, no notice thereof shall be entered on the minutes, but the candidate shall be notified.

5.—All elected candidates shall be duly notified and shall subscribe to the Constitution and Rules of the Society. Forms for these purposes shall be prescribed by the Board of Direction. If these provisions are not complied with within six months from the notification of election, such election shall be considered void, unless for special reason the time shall be extended by the Board of Direction.

Membership of any person shall date from the day of his election.

6.—Upon the written request of ten or more Corporate Members, that for cause therein set forth a person belonging to the Society be expelled, the Board of Direction shall consider the matter, and if there appears to be sufficient reason, shall advise the accused of the charges against him. He may, if he so desires, present a written defence which shall be considered at a meeting of the Board of Direction, of which he shall receive due notice. Not less than two months after such meeting, the Board of Direction shall finally consider the case, and if resignation has not been tendered, or a defence made which is satisfactory to the Board, it shall then notify the person that he will be expelled in one month, unless he elects to appeal from this decision. Appeals will be submitted to the Corporate Members by letter-ballot in a form to be prescribed by the Board of Direction. The ballot shall be accompanied by a statement of the charges, and of the action of the Board thereon, with such information as it deems proper, and also the statement of the person making the appeal. The ballot shall be canvassed by the Board not less than twenty days after its issue. A majority of the ballots cast will be required to sustain the action of the Board. The Board will notify the person and the Corporate Members of the result of the ballot. In case no appeal be made, the Board of Direction will expel the person, and notify him and the Corporate Members of its action.

7.—A member of any grade in the Society may resign his membership by a written communication to the Secretary, who shall present the same to the Board of Direction; when, if all his dues have been paid, his resignation shall be accepted.

8.—All persons elected and duly qualified, whose address on the records of the Society is within fifty miles of the Post Office in the City of New York, shall be deemed Resident; and those whose address is beyond that limit shall be deemed Non-Resident.

The classification of each person for the fiscal year as Resident or Non-Resident, shall be determined by the Records of the Society as they may appear on January 1st of that year.

Amendment to  
the Constitu-  
tion  
(continued).

The above amendment is proposed by the following Corporate Members:

JOHN F. WALLACE,	GEO. S. DAVISON,
DAVID SLOAN,	EMIL SWENSSON,
RALPH MODJESKI,	J. A. ATWOOD,
J. W. SCHAUB,	W. C. HAWLEY,
ALBERT F. REICHMANN,	W. G. WILKINS,
C. A. HASBROUCK,	JOSIAH A. BRIGGS,
FRANK J. LLEWELLYN,	J. J. R. CROES,
CHARLES L. STROBEL,	A. NOBLE,
GEO. F. SWAIN,	H. S. HAINES,
WILLIAM JACKSON,	JOS. O. OSGOOD,
JOHN E. CHENEY,	GEO. H. PEGRAM,
S. EVERETT TINKHAM,	EDW. P. NORT.

THE PRESIDENT.—Would it not be as well to give a concise statement as to the effect of this amendment?

Discussion on  
Amendment  
to the  
Constitution.

THE SECRETARY.—The first three sections of Article II are identical with the present Constitution, with the exception that the original Constitution states that in applications for admission of Juniors the applicant shall state that he intends to become or continue to be an engineer. The reason for taking that out is that this present amendment contemplates that no applicant, whether for Junior or for Member, shall make an application for any definite grade, and in the old Constitution it would require him to specify in the body of his application that he applies for junior membership. It is merely to make the matter conform with the remainder of the article.

Section 1 of Article III, relating to Honorary Members, is identical with the present Constitution; there is no change made.

Section 2 of Article III, relating to applications, is changed so that all applications received are applications for admission to the Society, not for admission as Member, Associate Member, Associate, Junior, or Fellow; and the whole intent of this section is to print in the preliminary list—what we call the blue list—the preliminary notice of candidacy, in an alphabetical list, all applications for membership exactly as is now done, with the names of references given, except that they shall not specify that some of them are for Member, some for Associate Member, some for Associate, some for Junior, and so on.

After exactly the same process as is now in vogue is gone through with by the Board of Direction, the Board classifies the applicant, and, having secured his consent to that classification, issues his name on a ballot list, exactly as at present, to all the members.

A MEMBER.—That includes Juniors too, does it?

THE SECRETARY.—Yes, that is as it stands at the present time. The next clause gives the Board the power to transfer persons from a lower to a higher grade without a further vote of the membership of the Society, and simply states that they shall notify the Society of that action. Under the present system, if a member is elected a Ju-

nior, he must again be elected an Associate Member, because he cannot transfer from Junior to full membership, and it is quite possible (and it has been done) that a man is elected to the Society by the membership three times.

The next clause is identical with the present clause of the Constitution in regard to letter-ballots, with the exception that, instead of seven negative votes excluding, the provision of this amendment is that there shall be twenty votes necessary for the exclusion of a candidate. Those are the only changes, Mr. President, except that in this amendment the present reconsideration ballot is entirely done away with. Under the present system the ballot on a candidate excluded by seven negative votes can be reconsidered upon the request of eight Corporate Members, and, having gone through the regular form, he can be elected, providing 10% of all the ballots cast, which are signed ballots, are not against him. In other words, while it is possible for a candidate, under the present Constitution, to be defeated with fifteen votes against him, it is also possible, and I may say that I believe it has been done, that a candidate has been elected with forty odd votes against him on the pink ballot. It simply depends on the number of ballots that come in. It is the percentage of the ballots cast. In this amendment the pink ballot is done away with entirely.

G. W. TILLSON, M. Am. Soc. C. E.—How soon can one come up for admission again if rejected?

THE SECRETARY.—There is no specification, sir, in this amendment as offered.

THE PRESIDENT.—The amendment is now before the Society for amendment.

J. J. R. CROES, Past-President, Am. Soc. C. E.—Mr. President, the first clause of Article III is rather indefinite. It provides for the admission of an Honorary Member, but there is nothing in the section thereafter which states precisely the manner in which a candidate for membership shall be admitted to the Society. I would move that there be added a third clause to Section 1 of Article III to read as follows:

“All members other than Honorary Members and Juniors shall be admitted to the Society only by vote of the Corporate Members as hereinafter specified.”

That covers the method of admission to the Society which is not contained in any other part of the Constitution.

A MEMBER.—How about Associates?

MR. CROES.—Associates are elected by a vote of the Corporate Members. As stated in the rest of the Constitution, all applicants make application simply for membership. The Board classifies them. The Society elects them. If they are classified as Members, as Associate Members, or as Associates, the ballot goes out for the person in that



Discussion on  
Amendment  
(continued)

grade, and, in the present form of the amendment, it provides for the election of Juniors in the same way. I wish to move an amendment also to the second paragraph of Section 3 of Article III.

THE PRESIDENT.—Would it not be best to take action on the proposed amendment first?

MR. CROES.—Well, yes; the first amendment I offer is this one, defining simply the manner in which members are admitted to the Society.

GEORGE H. PEGRAM, M. Am. Soc. C. E.—I second the motion, Mr. President.

A MEMBER.—How are Fellows to be elected?

THE PRESIDENT.—Will Mr. Croes answer the question?

THE SECRETARY.—Under this amendment, sir, by general vote, even if Mr. Croes' amendment passes.

MR. CROES.—Fellows shall be contributors to the permanent funds of the Society though they may not be eligible for admission as Corporate Members.

A MEMBER.—And they are elected by ballot?

THE SECRETARY.—Under this amendment; yes, sir.

MR. SEAMAN.—Mr. President, by this proposed amendment, a Junior does not come up for general ballot. He is elected by the Board. The Board can then, in a year or so, transfer him to full membership.

MR. CROES.—If the gentleman will pardon me, there is an amendment referring to that which the President directed should not be read at this time. I would state, though, that the amendment which I propose to offer in connection with that subject, after this amendment has been acted upon, is that the Board shall have power to elect persons to the grade of Junior and to transfer persons from any grade except that of Junior to a higher grade of membership. Those two go together, but they are separate amendments. If you adopt the first one you want to adopt the second one, too.

B. R. GREEN, M. Am. Soc. C. E.—How are Associates elected now?

MR. CROES.—By the Board.

MR. GREEN.—According to this proposed amendment, they are elected by the Society.

MR. CROES.—By the Society, yes.

MR. GREEN.—Is that desirable?

MR. CROES.—Yes. The question has been asked how Fellows are elected now?

THE SECRETARY.—They are elected by the Board, sir, just the same as Juniors and Associates.

MR. GREEN.—This makes them elected by the Members?

THE SECRETARY.—It makes every man elected to a permanent grade



in the Society elected by the membership at large. It allows the Board to elect a Junior, whose term as a Junior ceases when he becomes thirty years of age, and, consequently, as it is not a permanent grade, Mr. Croes proposes to have him elected by the Society again into one of the permanent grades.

THE PRESIDENT.—Are you ready for the question? If there is no further discussion, the chair will put the question.

The question was put and carried.

MR. CROES.—Now, Mr. President, I offer the amendment to the second paragraph of Section 3, Article III. It now reads:

“The Board shall have the power to transfer persons from a lower to a higher grade of membership, and shall notify the membership of its action.”

The amendment is, that the Board shall have the power to elect persons to the grade of Junior and to transfer persons from any grade except that of Junior to a higher grade of membership, and shall notify the membership of its action. It does not seem to me to be advisable to have the Juniors elected by the Society, but to have the Juniors elected by the Board, and when they want to go higher, their election by the Society takes place. That covers the question which Mr. Seaman asked.

The amendment was seconded.

THE PRESIDENT.—The amendment to the amendment is seconded. It is now before the Society for discussion. If there is no discussion, the Chair will put the question.

The question, being put, was carried.

THE SECRETARY.—I have a communication which I would like to read. It is from Mr. James Burden, an Associate Member of the Society.

“TROY, NEW YORK, May 3, 1903.

Letter from  
James Burden.

“MR. CHARLES WARREN HUNT,  
*Secretary Am. Soc. of C. E.,*  
*New York.*

“DEAR SIR:

“I am in receipt of the proposed amendment to the Constitution.

“In Article II, Section 6, it says of the Junior Member, that ‘his connection with the Society shall cease when he becomes thirty years of age.’ This is as the case now stands, and it has always seemed to me unfortunate. In nearly every class in an engineering school are some men who graduate so near this limit that they cannot avail themselves of the advantages of Junior membership, as they would not at thirty be eligible for Associate membership, yet these men are not infrequently those who have had to fight their own way, and are keenly in earnest in their professional work. It seems to me that the limit might well be thirty-five years. This would prevent no one from applying earlier for a higher grade.

“I have known application for Junior membership to be advised on the ground that at thirty a man would probably be admitted to

Discussion on  
Amendment  
(continued).

Associate membership who might be rejected if he were outside of the Society. If the limit were thirty-five he could be made to wait or would probably elect to do so himself.

"Very truly yours,

"JAMES BURDEN,

"Assoc. M. Am. Soc. C. E."

At Mr. Burden's request, I offer for him the amendment to change the word "thirty" to "thirty-five."

THE PRESIDENT.—Is the proposed amendment seconded?

The amendment was seconded.

THE PRESIDENT.—It is now before the Society for discussion.

H. F. WILSON, Jr., Assoc. M. Am. Soc. C. E.—Mr. President, it seems to me that thirty-five makes a man wait rather late in life. What is the matter with thirty-two or thirty-three?

MR. SEAMAN.—I think that is a good suggestion, Mr. President. I think thirty is the age which we should reach; but there is the objection suggested by Mr. Burden, and those on the Board are familiar with the fact that we often have to make special rulings, or rather the Board has often to make special rulings, to cover those special contingencies. I would move that the age of thirty be changed to the age of thirty-two.

THE PRESIDENT.—The motion is that the age be changed from thirty to thirty-two.

THE SECRETARY.—On behalf of Mr. Burden, acting for him as nearly as I can do in his absence, I will accept the amendment. I think it covers the ground that he intended to cover.

THE PRESIDENT.—If there is no objection, the age of thirty-two will be accepted in lieu of the age of thirty-five. Is there any discussion on the proposition as it now stands?

MR. WILSON.—It seems to me, Mr. President, that thirty-three would be better. The change is very little from thirty to thirty-two. It strikes me that if a man is going to get out of college at all he will get out at the age of thirty years, and he will then have two years in the Junior grade before he can go into the grade of Associate Member.

THE SECRETARY.—If I am allowed one more word, I think the only objection to changing the time at which a Junior ceases to be a Junior of the Society is that, under the present Constitution the age at which he ceases to be a Junior is coincident with the age at which he becomes eligible for membership. Consequently, it is impossible for a Junior to transfer from the grade of Junior to the grade of Member under our present Constitution. That has elements of propriety, however, inasmuch as it then becomes necessary, if he wants to continue his connection with the Society, to go through the grade of Associate Member. I think, however, that this matter would be entirely

in the hands of the Board of Direction. We would simply get more applications from people who wanted to transfer from the grade of Junior to the grade of Member, because they would become eligible, because a man is eligible when he is thirty for the highest grade, but under this amendment perhaps the same thing would not obtain, because no man applies for any specific grade of membership. I merely make that as a suggestion.

THE PRESIDENT.—Any further discussion? The question is on the substitution, in Section 6, of Article II, of the words “thirty-two” for “thirty.”

The motion, being put, was carried.

THE SECRETARY.—If there is no further discussion of this amendment, I have a communication from Mr. Samuel Whinery.

Letter from  
S. Whinery.

“NEW YORK, May 29, 1903.

“MR. CHAS. WARREN HUNT,

“*Secretary, Am. Soc. C. E.,*

“220 West 57th St., N. Y.

“DEAR SIR:—As I shall not be able to attend the Asheville Convention, at the business meeting of which the pending amendments to the Constitution of the Society are to be discussed, I ask, if it will be in order, to submit my views on these amendments in writing.

“If I correctly understand the proposed amendments, they will, if adopted, in their present form, change the present practice of the Society in the following particulars:

“1st.—Applications for admission would be simply for membership, and the Board of Directors would determine the class to which the applicant may be admitted. It is not clear, however, from the language of the amendment, that applications for advancement to a higher grade shall be simply for transfer, without reference to grade, since the first sentence of Section 2, Article III, seems to contemplate that applications may be made to the Board for transfer from one grade to another stated grade. The logical inference from the trend of the amendments is that beyond an application simply for transfer, the grade to which the applicant is to be transferred shall be determined by the Board. Indeed, if the general spirit of the proposed change is adhered to, the logical conclusion would be that the initiative in proposing transfers should be taken by the Board, and should not originate in a request by the applicant. There would obviously be serious objections to this principle in practice, since the Board would then be charged with following the professional career of each member in any class in order to propose deserved promotions. While the Board should undoubtedly have the right, after proper investigation, to classify applicants for either admission or transfer, there seems to me to be no sufficient reason why applications should not, as now, be made for admission or transfer to a definite grade.

“The only objection to the present practice that seems to have any weight is that it may be personally embarrassing to the applicant, after having applied for membership in any stated grade, to be assigned to a different and perhaps lower grade by the Board. I think the importance of this objection has been greatly exaggerated. If, however, any applicant is sensitive on that point, there is now nothing to prevent him from applying for admission or transfer to any grade

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(continued).

the Board may elect,' instead of naming the grade to which he aspires. In favor of the present practice it may be said that while the Constitution attempts to define the qualifications necessary for admittance to each grade, the question whether an applicant meets these qualifications is an open one, which each corporate member has the right to decide for himself, and to vote accordingly, whatever may be the judgment of the Board. A member may have perfectly valid reasons for voting for the admission of an applicant to one grade and for voting against his admission to another. Furthermore, these reasons may be such that if the grade applied for is stated in the 'blue list' a member may write to the Board giving reasons why the applicant should not be admitted to that grade, while if the grade is not stated in the 'blue list' he may neglect to communicate with the Board under the impression that that body will classify the applicant in accordance with his (the member's), views, and if, when the ballot is issued, he finds that the applicant has been classed in a higher grade than seems proper, he may feel compelled to cast a negative ballot, not because of any objections to the applicant himself, but because he has been placed, by the Board, in a class to which, in the opinion of the voter, the applicant is not entitled. If rejected for such reasons alone, the applicant might have greater cause for dissatisfaction and embarrassment than if the grade he aspires to, after being published in the 'blue list' were changed by the Board before the ballot were sent out.

"2nd.—The number of ballots necessary to reject an applicant would be twenty or more instead of seven or more, as at present. I favor an increase of the number of negative ballots required to reject, and with the present number of corporate members, twenty is not unreasonable, though in my opinion that number is rather too high. Since, however, the membership is rapidly increasing, this number of adverse votes may, before very long, be relatively smaller than seven when the Constitution was adopted, or than it is even now. I think the number of negative ballots necessary to reject should bear some definite ratio to the number of corporate members. A satisfactory ratio once adopted, it would not then be necessary to again change the Constitution with the growth of the Society. If the ratio were fixed at three-quarters of one per cent. of the corporate membership, the number of negative votes required at the present time would be seventeen which seems to me to be about right.

"The proposed amendments are silent upon the question whether a rejected candidate may subsequently renew his application for membership. In view of the probable abolition of the present provisions for reconsideration I think provision for renewal of application should be made, particularly since if not defined in the Constitution, the question of the legality of such renewal of applications is quite sure to arise in the future.

"3rd.—The provision for reconsideration of the ballot upon rejected applications would be abolished. There seems to be wide dissatisfaction in the Society with the existing "Pink ballot" system and it is probably advisable to abandon it; though such abandonment may sometimes result in grave injustice to worthy members of the profession.

"4th.—After admission to any grade of membership the Board would have the power to transfer the persons so admitted to higher grades of membership without the formality of a ballot by the corporate members. In other words, a person admitted to Junior mem-



bership might be advanced successively to the grade of Honorary Member without giving the corporate membership an opportunity to vote upon the question.

“It may readily occur that the desirability of submitting an application for advancement to a ballot of the membership may be greater than upon the original application for admission. Corporate members who voted for the admission of an applicant as Junior may have good reasons to vote against the advancement of that Junior to full membership, and they should not be deprived of the right to do so. If a ballot upon admission is desirable or important at all, it must become more desirable and important in the case of proposed advancement to the grades of Associate Member and Member. I am opposed to this feature of the proposed amendment.

“5th.—Under the proposed amendment applications for admission to the grade of Junior would be treated precisely as are applications for admission to the higher grades, including the ballot by the corporate members.

“Inasmuch as the grade of Junior is a temporary one, membership in which expires by limitation at the age of thirty, I can see no necessity for the proposed change. It seems desirable, for the encouragement and help of the young members of the profession, to allow them to enter the Society in the grade of Junior with as little formality as possible. The question of professional standing or conduct generally does not exist or it is not important. If the applicant possesses the constitutional requirements for admission, and no evidence is presented derogatory to his personal character, there seems no good reason why the Board should not admit him without the formality of a membership ballot.

“For the reasons stated, I would, if present at the Convention, move that the proposed amendments be amended as follows:

“1st.—Strike out Section 3 of Article III and substitute therefor the following:

“3. At stated periods, to be determined by the Board of Direction, there shall be issued to each member in any grade whose address is known, a list of all applications received for admission, or for transfer from one grade to another, which list shall be dated and shall contain a concise statement of the record of each applicant and the names of his references, with a request that members transmit to the Board any information in their possession which may affect the disposition of the applications. Not less than twenty days after the issue of such list, the Board of Direction shall consider these applications, together with any information in regard to the applicants that may have been received; may make further inquiries if deemed expedient; and may, for reasons deemed sufficient, reject the application. If not rejected, the Board shall determine the grade of membership to which the applicant is entitled, and, with his consent, may, except in the case of applications for Junior, direct a ballot.

“2nd.—Strike out the last paragraph of Section 3, Article III, reading as follows: ‘The Board shall have power to transfer persons from a lower to a higher grade of membership, and shall notify the membership of its action.’

“3rd.—In Section 4, Article III, strike out the sentence, ‘Twenty or more negative votes shall exclude from election,’ and substitute therefor the sentence, ‘If upon such ballot the number of negative votes, in the case of an applicant, shall exceed three-fourths of one percent., excluding fractions, of the total number of corporate members of the



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(continued).

Society, as shown by the Secretary's report at the last preceding Annual Meeting, such applicant shall fail of election.'

"4th.—Add to the end of Section 4, Article III, the following: 'The Board of Direction, after making such inquiries as it may deem necessary, shall have the power to elect applicants to the grade of Junior; and shall notify the membership of such election.'

"A rejected applicant may renew his application for membership at any time after the expiration of one year from the date of the ballot rejecting his previous application.'

"If the amendment, so amended, were adopted, the resulting changes in the present practice of the Society would be as follows:

"Applicants for admission to the Society would be classified by the Board; applications for admission to all grades except that of Junior, and for transfer from one grade to another would be submitted to ballot by the membership; the number of negative ballots necessary to reject an applicant would be largely increased and fixed at a definite ratio to the corporate membership; rejected applications might be renewed after one year, and the 'Pink ballot' system would be abolished.

"Yours very truly,

"S. WHINERY."

It seems to me that the suggestion of Mr. Whinery, that a rejected applicant may renew his application for membership at any time after the expiration of one year from the date of the ballot rejecting his previous application is a very wise one, and it is practically what is done now.

MR. SEAMAN.—I will second that portion, providing that it may be renewed at the end of one year.

THE SECRETARY.—It may be placed at the end of Section 4 of Article III:

"A rejected applicant may renew his application for membership at any time after the expiration of one year from the date of the ballot rejecting his previous application."

THE PRESIDENT.—Is there any amendment to the amendment as read? It has been seconded and it is before the Convention. Is there any discussion?

G. S. DAVISON, M. Am. Soc. C. E.—Mr. President, I should think that the absence of that condition in the Constitution would be just the same as the addition to it. I should think that after a man is rejected, there is no record made of it, and he is privileged to come before the Society at any time. The only difference would be that he might come before the year is out. It is not very likely that the Board of Direction, having had charge of a man's candidacy once, would take it up again within the same year.

THE SECRETARY.—I think I might answer that objection by saying that all applications which come in must go out on the blue list before they come to the Board of Direction at all, so that in case it were not definitely fixed that a certain time should elapse after the original ballot, a man might send in an application once every three months,

and if the usual routine were carried out, his name would go out on a blue list each time as a candidate before it would come to the attention of the Board.

MR. DAVISON.—I can see the force of the argument, and I think the suggestion is a very good one.

THE PRESIDENT.—Is there any further discussion?

RUDOLPH P. MILLER, Assoc. M. Am. Soc. C. E.—Mr. President, according to this proposed amendment, it seems that the Board does not have to notify the membership of the request for a transfer from a lower to a higher grade. It seems to me that the members ought to have some right to speak on such a matter. There is as much reason why a member should be privileged to express his reasons why a man should not be transferred in the case of a transfer as in the case of an application for membership.

THE SECRETARY.—May I make another explanation? Section 3 of Article III provides that:

“At stated periods, to be determined by the Board of Direction, there shall be issued to each member in any grade whose address is known, a list of all new applications received for membership in any grade or for transfer from one grade to another.”

B. M. HARROD, Past-President, Am. Soc. C. E.—Does the amendment by Mr. Whinery determine the question whether a transfer shall be made by application or by immediate action of the Board? I think that point ought to be settled.

THE PRESIDENT.—The Chair would suggest that it might be well to pass upon the question of the renewal of an application before taking up another subject. Is there any discussion on the motion providing for the period of one year elapsing on the rejection of an application before it can be renewed?

There being no further discussion, the question was put and carried.

MR. HARROD.—I think it ought to be settled whether a transfer is to be made by application from the member or by the immediate action of the Board of Direction.

THE SECRETARY.—Section 2 of Article III, as amended, provides that:

“An application for admission to the Society or for transfer from one grade to another shall embody a concise statement, with dates, of the candidate's professional training and experience; and shall be in a form and in such detail as may be prescribed by the Board of Direction. It shall be signed by the applicant, and shall contain a promise to conform to the requirements of membership, if elected.”

MR. HARROD.—Do you think that is a sufficient notice to members; that if they desire a transfer, they may make application themselves?

THE SECRETARY.—Yes, that seems to cover the point.

THE PRESIDENT.—Does any member desire to offer any further amendments to the amendment? If not, the Chair will declare the dis-

Discussion on  
Amendment  
(continued).

cussion on the proposed amendment closed, and it will go out to the membership on the letter-ballot in the usual way.

Project for  
Joint Engi-  
neering Build-  
ing.

The next topic before the Convention is the proposed co-operation of the Society with other National Societies and the Engineers' Club of New York in the erection of an Engineering Building. The Secretary will read a statement covering the history of the proposition up to this time.

THE SECRETARY.—A brief outline of the inception and history of the project to date is as follows: After a preliminary meeting with Mr. Andrew Carnegie, Mr. Charles F. Scott and Mr. Calvin W. Rice, of the Electrical Engineers, called a meeting of some members of each of the Societies, and of the Engineers' Club, on February 11th, 1903. This meeting resulted in the appointment of a Committee consisting of Messrs. Scott and Rice of the Electrical Society, Messrs. Redding, Kafer and Thomson of the Engineers' Club, the latter also a member of this Society, and Mr. John Fritz, and this Committee had a conference with Mr. Carnegie on February 14th, 1903. At this time the Engineers' Realty Company had secured a 50-ft. lot on West Fortieth Street. At this conference Mr. Carnegie wrote the following letter:

Letter from  
A. Carnegie,  
Esq.

“2 EAST 91ST STREET,

“NEW YORK, FEBRUARY 14TH, 1903.

“Gentlemen of the American Society of Civil Engineers, American Society of Mechanical Engineers, American Institute of Mining Engineers, American Institute of Electrical Engineers, and the Engineers' Club:

“It will give me great pleasure to give, say, one million dollars to erect a Suitable Union Building for you all, as the same may be needed.

“With best wishes,

“Truly yours,

“ANDREW CARNEGIE.”

After several subsequent meetings of those who were identified with the project, the various societies appointed each a committee of three to formulate a scheme for presentation to the societies for action. (The Committee of this Society could not be legally appointed prior to the first conference meeting, and the President was requested by an informal meeting of members of the Board of Direction to appoint such a Committee.)

Resolutions of  
May 15th, 1903.

The resulting resolutions, passed at a joint conference, May 15th, 1903, were presented to the Board of Direction at its regular meeting, June 2d, 1903, and action taken which was in harmony with the recommendations of its Committee.

“1. *Resolved*, that this Joint Conference Committee recommend to the respective governing bodies represented at this conference, that the following resolutions be brought before the several organizations, to be acted on:

“2. *Resolved*, that (*insert name of organization*) unite with (*insert the names of the other four organizations*) or any of them, for the pur-

pose of accepting the sum of \$1 000 000 as a gift from Mr. Andrew Carnegie, for the purpose of erecting suitable buildings for occupancy by various societies of engineers and The Engineers' Club, on the sites secured for the purpose on the north side of Thirty-ninth Street and south side of Fortieth Street west of Fifth Avenue, in the City of New York, in the State of New York.

"3. *And resolved further*, that (*insert name of organization*) has a very high appreciation of this generous gift of Mr. Andrew Carnegie, and this additional evidence of his recognition of the engineering profession and his deep interest in the welfare of the national societies of engineers and The Engineers' Club.

"4. *And resolved further*, that a site on the north side of Thirty-ninth Street shall be purchased and held by trustees, or otherwise as shall be determined by the joint committee hereinafter mentioned for The American Society of Civil Engineers, The American Society of Mechanical Engineers, The American Institute of Electrical Engineers, and the American Institute of Mining Engineers, or by such of them as shall vote in favor of coming into this enterprise.

"5. *And resolved further*, that a joint committee shall be created, to be composed of three members of each organization, that shall unite in accepting said gift of \$1 000 000 from Mr. Andrew Carnegie; and that the governing body of (*insert name of organization*) shall elect three members of this organization to represent it on and be members of such joint committee; and that the governing body of (*insert name of organization*) shall have the right and power to remove any member of such joint committee who shall be elected by it and to elect any member of this organization to fill any vacancy that shall occur in such joint committee by reason of the death, resignation, refusal to act or removal of any member who shall have been elected by the governing body of this organization as a member of such joint committee.

"6. *And resolved further*, that the character and internal arrangement of the building to be erected on the site on Thirty-ninth Street shall be determined upon by the affirmative vote of at least two-thirds of all of such of the members of said joint committee as shall represent all of the organizations, other than The Engineers' Club, on such joint committee; and that the character and internal arrangement of the club building to be erected on the site on Fortieth Street shall be determined upon by the affirmative vote of all of the three members of such joint committee who shall represent The Engineers' Club on such joint committee.

"7. *And resolved further*, that said joint committee shall, by the affirmative vote of at least two-thirds of all the members thereof, select and employ an architect to prepare the plans and specifications for the building to be erected on the site on Thirty-ninth Street, and for the club building to be erected on the site on Fortieth Street; and shall also obtain proposals for the erection of both of such buildings; and shall have power to make and enter into such contract or contracts as shall be approved and authorized by the affirmative vote of at least two-thirds of all the members of said joint committee, for the erection of both of such buildings; and shall have charge of the erection of both of such buildings.

"8. *And resolved further*, that said joint committee shall continue in existence until all of the purpose set forth in these resolutions shall have been fully accomplished."



Resolutions of  
the Board of  
Direction.

The Board's resolutions were as follows:

"*Whereas*, the resolutions submitted by the Joint Conference Committee in the matter of the Proposed Union Engineering Building are not in suitable form, in the opinion of the Board of Direction of the American Society of Civil Engineers, to be submitted to the Society;

"*Resolved*, That it is the sense of this Board that the proposition, when submitted to the Society, should make definite provision for the accommodations necessary for the present and future needs of the several organizations, and that the proportion of the total expense to be borne by each of the organizations concerned should be definitely stated, and be it further

"*Resolved*, That the Board of Direction recommends, to the Business Meeting to be held at the Annual Convention, the adoption of the following resolutions:

"*Resolved*, That the Board of Direction be authorized to ascertain whether suitable accommodations can be obtained for the Society in the proposed new building, with provisions for future needs.

"*Resolved*, That the Board of Direction be authorized to co-operate to this end with the other organizations concerned.

"*Resolved*, that the Board of Direction be requested, provided it is satisfied that suitable accommodations can be obtained, to send to the members of the Society a letter-ballot by means of which a direct expression of the wishes of the Society in the matter may be secured, and to accompany such ballot by a statement of reasons for and against uniting in the scheme with the other organizations.

"*Resolved*, that the Board of Direction, in case a majority of the members, as shown by letter-ballot, are in favor of uniting with the other organizations, is authorized to proceed in behalf of the Society in carrying out the project."

THE PRESIDENT.—The Chair would suggest that in order to bring the resolutions recommended by the Board before the Convention, their adoption might be moved by some member and then the matter will be before the members for discussion.

G. W. CATT, M. Am. Soc. C. E.—To bring the resolutions before the Society, I move their adoption.

The motion was duly seconded.

THE PRESIDENT.—The question is now before the meeting for discussion.

J. F. WALLACE, Past-President, Am. Soc. C. E.—Mr. President, and Gentlemen of the Society: It is a very embarrassing thing, sometimes, to decline a gift, and it is frequently more embarrassing to accept it. When that gift, however, is coupled with conditions, and particularly when those conditions are complex and not easily understood, we may be pardoned for hesitating and giving it a great deal of careful consideration before we give our full acceptance. The passage of this resolution, as I understand the tenor of it, simply



states the case and would put it before the Society for action when it is voted on. Am I right? The refusal to pass the resolution simply places us in a position where, under certain conditions, an answer should be returned to Mr. Carnegie.

The situation, however, is peculiar, in one way, and that is, I do not think, or at least if I am mistaken I beg to be corrected, I have failed yet to see or hear any formal proposition from Mr. Carnegie actually making this offer, as I understand it. Is there an offer of that kind, Mr. President, before the Society? Has there been a formal tender of this amount to the American Society for this purpose?

THE PRESIDENT.—The tender was made in a letter addressed by Mr. Carnegie to the several Societies, the four National Engineering Societies and the Engineers' Club. The original of that letter has never been presented to the Board. It has never been presented, I think, to the Boards of any of the Societies. It is a paper that is not desirable to carry around, but the Chair would state that he has seen the letter, and it is a *bona fide* offer, with Mr. Carnegie's signature attached, as the Secretary has read.

MR. WALLACE.—That being the case, of course, it devolves upon us, as a matter of courtesy, to return some answer, and the question we have to face for the Society is what that answer shall be.

As I said before, the passage of this resolution would bring it before the members of the Society for a letter-ballot. The failure to pass the resolutions will bring the matter before the Society as to what answer should be returned.

The general question embraces two elements for our consideration; one, a professional one, and the other, one of expediency. From the professional standpoint we should not forget that the American Society of Civil Engineers is not a technical society. It is a professional institution. We, and those who have preceded us, have been working together for fifty-one years to build up an institution which shall show to the world the progress of the civil engineering profession in America. The Society has a prestige and it represents the best engineers in America. The profession of civil engineering embraces all the technical engineering branches; it embraces all the specialties; and we should bear in mind that it has been our effort to work to the end that it might do so.

We should also bear in mind that we should not be placed in the position of being the remnant of that profession, or what is left after the profession is subdivided into the several specialties which have sprung up, in our country and among the members of our profession, in the last twenty-five years. (Applause.) We should not forget that our Society stands for something, and it stands for the united efforts

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(continued).

of its members for half a century. We should not, for a mess of pottage, trade that prestige off or do anything that would in any way take away from it. (Applause.)

I speak rather strongly on that subject, because I have always been a non-resident member, and the Society appeals to a non-resident member in two ways; one, as a source of communication with other members of the Society, as a source of information through the papers and publications, and the other through that spirit that brings professional men together, the prestige of the Society, and the feeling of that connection, the feeling that you are a member of the American Society of Civil Engineers that goes with the man that is isolated on the frontier, and helps him to do his work, and helps him to do his duty, and helps him to maintain his integrity, and causes the sun to be less hot, the rain to be less wet, and the air to be less cold when he has difficult physical tasks to perform, and causes him to maintain his integrity alone and without the support of his fellows. There is a bond there, and we do not want to do anything to lower the standards that we have set up.

From the standpoint of expediency, the American Society of Civil Engineers is to-day on a firm financial basis. We have property worth over \$200 000, for which we are under no obligations to anyone. We have a small debt, but the surplus which can be set aside from our dues is perfectly able to take care of that. In other words, in a few years we will be debt-free, and we will even have to hunt some source of expenditure to properly spend the money that comes to us from the dues of the members in a legitimate way. We have ample accommodations. We do not need any more accommodations. Our house is located satisfactorily, and the question naturally comes, from the point of expediency, why should we change? We certainly should not unless there is a great preponderance of reasons for our doing so.

The main reason advanced, or we should presume it to be, is to centralize the engineering societies and the engineering interests.

I dislike very much to speak plainly, because I am a member of the Engineers' Club, and I have friends in the other engineering organizations, and I do not wish to belittle their efforts, or to say anything to which they may take exception, but, in the first place, to look at it from simply the commercial standpoint. There is land to buy, which, I understand, will cost in the neighborhood of \$500 000—is that right, Mr. President?

THE PRESIDENT.—That is about right.

MR. WALLACE.—Yes, about half a million dollars, of which we will be expected to contribute either one-quarter or one-fifth, depending upon how many associations go into it. After the land is purchased, as I understand the proposition, there is to be a million-dollar building erected thereon. As I understand the situation, however, the

first part of that money is to be used to provide quarters for an engineers' club, which is practically an engineers' club in name only. (Applause.) I understand that hardly half the members are engineers in the sense that they are even members of the technical societies. It is an institution that is social and largely, or very largely, commercial. (Applause.) There will be left for this Union Engineering Building the residue after the quarters of this social and commercial association are provided. Dividing that space or those quarters by four, as I understand it, we will be in possession of less cubic feet of building for our accommodation than we now have in our present location. We will only have one-quarter of a voice in the management of that building. We contribute a library. The assembly room and all the general facilities of that building are open to a membership that will probably be, in a few years, from 12 000 to 15 000 people, scattered all over this country. We, of course, will have our meetings exclusively. We will still be the American Society of Civil Engineers, but it seems to me that an affiliation of that kind rubs something off the bloom of the peach (applause), or, at least, that is the way it appeals to a non-resident member, in the West.

Looking it over, looking all sides of it over, there does not seem to be any proper reason why the American Society of Civil Engineers should go in and share and share alike with the other organizations that are interested in this matter. I can see plainly why it would be a very desirable thing for the Engineers' Club; I can see plainly why it would be a very desirable thing for the Mechanical Engineers, or for the Electrical Engineers, or for the Mining Engineers, provided they desired it, or for all of them combined, to have the lump leavened with the American Society of Civil Engineers. I cannot see why the American Society of Civil Engineers should leaven the lump.

If it is desired to ask for our co-operation, instead of our affiliation, that is another matter. If we could contribute, or obligate ourselves for some sum toward this building, say \$50 000, if you please, or any moderate sum that we could raise ourselves, and help these gentlemen bring about a union building, and have our sub-quarters in it, if you please, and help them in every way, I would be most heartily in favor of it; but I think we lose something in dignity, we lose something in professional prestige, and we will surely lose something in our ability to control our own affairs, and the room in which we live, and the house in which we live, if we enter into a close affiliation of the kind set forth in these resolutions and provided for in this proposition. (Applause.)

GEORGE H. PEGRAM, M. Am. Soc. C. E.—Mr. President, and Gentlemen: There seems to be a good deal of misconception as to what the conditions are under which we are asked to accept this proposition. Mr. Carnegie has apparently provided no conditions except that the participating bodies shall procure the land.

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Building  
(continued).

Some suggestions have been made as to how the libraries should be treated, that is, that they might be put in adjoining rooms, but still there are no conditions as to that. There is nothing in the way of each organization owning and keeping its library intact, as it does now. In fact, the only proposition now is the joint tenancy of that building. There is no question of affiliation involved. The other societies, that is, the Mining Engineers, the Mechanical Engineers and the Electrical Engineers have practically adopted those resolutions that were originally presented to our Board of Direction and were rejected by our Board as not suitable in their present shape to present to the Society. These three societies have practically accepted them and appointed the joint committee that is to confer and to direct the execution of the project. The Engineers' Club was to have acted last night, and probably did so, as they practically drew up the resolutions and have been in favor of them all along.

That, then, leaves it with the four organizations, that is, all the organizations except the American Society of Civil Engineers, with their permanent committees appointed. All along they have assured us that whether we came in or not, it made no difference to the carrying out of the project. A Committee, really of information, was appointed at an informal meeting of the Board of Direction, when the matter was first brought to our notice, and they directed the President to appoint two members to act with himself. The President appointed Mr. Wilgus and Mr. Freeman, but Mr. Freeman, being a member of the Board of Direction of one of the other societies, declined, and I was appointed in his place.

Mr. Freeman, at that meeting represented, probably as Mr. Wallace has, the sentiment of his locality, and we were rather surprised to find such a unanimous sentiment in Boston, because in New York we felt that everybody was pretty much at sea. Apparently, none of the Boston people are here—I don't know whether they are here or not—but Professor Swain, who was present at the meeting of the Board of Direction which adopted these resolutions that have been presented to-day, has sent a letter to our Committee giving the sentiment of the Boston members as far as they could determine it, and in his absence I think it would be proper to read that letter here if there is no objection, Mr. President.

Letter from  
Geo. F. Swain.

This is from Professor Swain, and it relates to a telegram that was sent to him at New York from Boston, while he was in attendance upon one of our Board of Direction meetings. It says:

“BOSTON, MASS., June 4, 1903.

“MR. ALFRED NOBLE,

“20 West 34th St.,

“New York, N. Y.

“MY DEAR MR. NOBLE: I am very sorry that the telegram which was sent me from Boston, containing the result of a canvass of the members there with reference to the Carnegie proposition, was not de-



livered to me Tuesday evening. You will be interested in its contents, which were as follows:

- “ ‘Result of ballot of acceptance, Carnegie offer,
- ‘ In favor, 47;
- ‘ In favor with present information, 33;
- ‘ Non-committal, 7;
- ‘ Opposed with present information, 7;
- ‘ Opposed, 9.

‘ S. E. TINKHAM.’

“ This is a result which is a little surprising to me and is very satisfactory; and I think it shows one thing quite conclusively, and that is that the Society should pass the resolutions which we voted Tuesday evening to recommend to the meeting at Asheville. I think likely some of the members who are opposed to the plan would like to reject it entirely and have nothing whatever to do with it. I sincerely hope, however, that the Society will have more discretion. Personally, I thoroughly believe in the scheme in principle, but of course the practical details must be worked out before we can definitely enter into it. Personally, also, I believe that these details can be worked out. I think the spirit in which we should approach it is an earnest spirit of appreciation and a sincere desire to make the scheme a success, and that, if we approach it in this way, we can make it a success. On the other hand, if we start in with the hope and the desire to pick flaws and to defeat the scheme, we might be able to do so.

“ I thought you might be interested in this result showing the feelings of the Boston members, and I send it to you for the reason that I cannot go to Asheville, and I thought it might be of some use to you if necessary to persuade the Society to take the initial steps and pass our resolutions. I am sending a copy of this letter to the other two members of your Committee.

“ Very sincerely yours,

“ GEO. F. SWAIN.”

I would say in explaining those resolutions which were offered, that the Board of Direction, or rather the Committee appointed by the Board, asked the opinion of counsel as to the legal procedure and as to certain questions about which we were in doubt; for instance, whether, if we accepted and became one of the proprietary bodies and had a joint committee in which we would always be in a minority, we might, if such a condition became distasteful, withdraw, without the loss of what we had put in. The opinion of counsel and answers to those questions, and also with reference to these resolutions, I probably had better read, Mr. President. This was obtained for information only; in fact, our Committee has been simply one of information. This is addressed to Mr. Alfred Noble, President.

“ NEW YORK, June 2, 1903.

Letter from  
Counsel.

“ ALFRED NOBLE, Esq.,

“ 20 West Thirty-fourth Street.

“ New York City.

“ DEAR SIR: In the matter of the proposition of Mr. Andrew Carnegie to erect a union engineering building, you ask me as to the effect



Discussion on  
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(continued).

of resolutions of substantially the following purport, if adopted by the American Society of Civil Engineers at its general business meeting:

"(1) A resolution authorizing the Board of Direction to ascertain whether suitable accommodations can be obtained for the Society in the proposed new building, with provision for future needs.

"(2) A resolution authorizing the Board of Direction to co-operate to this end with the other Societies.

"(3) A resolution requesting the Board, provided it is satisfied that suitable accommodations can be obtained, to send to the members of the Society a letter-ballot regarding the proposed new building, accompanied by a statement of reasons for and against uniting in the scheme with the other Societies.

"(4) A resolution directing the Board, in case a majority of the members, as shown by letter-ballot, favor the project of erecting the new building, to proceed with the other Societies in the erection of the building.

"I have no hesitation in saying that such resolutions so adopted would be in harmony with the Constitution of the Society and that the Board of Direction would, upon the adoption of the resolutions, be legally warranted in acting in conformity with the resolutions.

"You ask what would be the situation if one of the other Societies mortgaged its interest in the new building and defaulted in payment under the mortgage.

"You also ask me what would be the situation in case of the withdrawal of one Society.

"I venture the suggestion that an agreement can doubtless be framed covering the foregoing points, with such others as may occur, in a way to safeguard the Society's property interests provided the Carnegie proposition is accepted.

"It would be not only the right, but the imperative duty, of the Board of Direction to insist upon the execution by the other Societies of instruments necessary to protect the American Society of Civil Engineers, as a condition precedent to committing that Society to a fixed plan.

"Yours truly,

"HERBERT E. KINNEY."

There are some other communications, Mr. President, which have come to our Committee, if it is proper to read them.

THE PRESIDENT.—You may read them.

MR. PEGRAM.—Here is a telegram received from New York, addressed to Mr. Noble:

Telegram  
from several  
Members.

"We, the undersigned, members of the American Society of Civil Engineers, without now expressing our preference for or against the Society's participation in the gift of Mr. Andrew Carnegie, to the cause of engineering, most respectfully recommend their fellow members, assembled at one of its regular general business meetings, that the question be submitted to the entire membership by letter-ballot without unnecessary delay, as such action, in our opinion, and according to competent legal advice is fully warranted under our Constitution; and, moreover, it is the individual right of every member to have the opportunity to vote on so important a matter.

"HENRY G. PROUT, CHARLES MACDONALD, S. WHINERY, JOHN FRITZ, O. F. NICHOLS, D. L. HOUGH, JOHN BOGART, W. E. BAKER, JOHN F.

O'ROURKE, GEORGE W. MELVILLE, A. MACKENZIE, GEORGE A. JUST, FOSTER CROWELL, W. L. SAUNDERS, M. LEWINSON, ROBERT B. STANTON, D. MCN. STAUFFER, L. L. BUCK, E. E. OLCOTT, EMIL KUTCHLING, E. G. SPILSBURY, J. WALDO SMITH, BERNARD R. GREEN, JOHN THOMSON, A. P. BOLLER, H. W. HODGE, GEO. W. MCNULTY and WILLIAM METCALF."

CHARLES HANSEL, M. Am. Soc. C. E.—Do you offer this as a resolution?

MR. PEGRAM.—No, this is simply information that has come to the Committee from members who cannot be present.

MR. HANSEL.—I understand they asked that it be offered as a resolution.

MR. PEGRAM.—Well, the course outlined in the resolutions before you is to this same end, that the matter be decided by letter-ballot.

MR. GREEN.—Mr. President, my name is attached to this telegram, and I wish to explain that I gave a very hasty answer, yesterday afternoon before leaving Washington, to a telephonic communication which did not give me quite all the information that is contained in that telegram. I am willing to vote for the letter-ballot in proper time, but not immediately, and therefore, as the thing now reads, I would rather my name should be withdrawn from among the signatures.

THE SECRETARY.—I have two letters that were addressed to the Board of Direction, one from Past-President A. Fteley, and one from Mr. E. L. Corthell.

"May 31st, 1903.

Letter from  
A. Fteley.

"TO THE BOARD OF DIRECTION OF THE AM. SOC. C. E.

"SIRS. Allow me to contribute a few words, as a member of the Board of Direction, to the discussion of the Carnegie proposition which is to take place at your next meeting.

"The perusal of the pamphlet sent me by President Noble suggests the thought that the whole matter was started and prepared, almost entirely, without consultation with any authorized member of our Society; probably in the expectation that the glamour of the munificent offer made could prevent all possible opposition, if any were intended.

"That other bodies, differently situated in material prosperity or otherwise, think it out of the question to refuse the offer made, I easily conceive, and, from the statements made to him, Mr. Carnegie probably received the same impression.

"I feel confident, however, that it would be against the best interest of our Society to follow the others in the acceptance of the pending proposition. We have worked many years to build up our organization and we have now reached, professionally, financially and materially, a desirable position with which we should be satisfied. To now partially lose our distinct identity and to unite with other bodies, some of which have not the same aims as ourselves, would be of no advantage to us and might be of detriment.

"I fail especially to see the propriety of uniting with the Engineering Club. Admirable as it may be in its own sphere, its aims

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(continued).

and methods are obviously different from ours; it is not a professional organization, and, as it would actively occupy its part of the proposed building every day in the year, it would obviously appear to outsiders to be a representative body and would give to the whole a social and festive character which we do not care to assume. Many of its members, I understand, are commercial representatives of firms, the sale of whose goods and products are controlled by Engineers, and an apparently close association would hardly be consistent with the 'maintenance of a high professional standard' mentioned in our Constitution as one of the main objects of our Society.

"The whole subject has been treated with undue haste. In the pamphlet sent me by the President, and in the press references which have reached me, I have not seen a word in regard to the financial management of the proposed building. The equipment and maintenance of such a large establishment is very expensive, and, from what I know of the financial resources of the bodies invited to join the Union, they would have to increase substantially their annual outlay in order to meet the expense of the annual maintenance and the gradual extinction of the debt contracted for the purchase of the land.

"A number of financial and legal questions connected with the joint ownership and management of the property would necessarily arise and should be inquired into before launching into such a radical change as is now proposed. Competent legal opinion alone can define the legal status of the various members of the joint ownership.

"With hopes that the call of the Board for an expression of opinion by the members of our Society will be accompanied by such a sober and judicial statement as will convince them that it is for our own best interest to retain in full our present identity, and counteract any contrary argument that may be sent independently to them, I remain,

"Yours respectfully,

"A. FTELEY,

"M. Am. Soc. C. E."

"GREAT BARRINGTON, MASS., May 29, 1903.

Letter from  
E. L. Corthell.

"TO THE BOARD OF DIRECTION,

"*American Society of Civil Engineers,*

"220 West 57th St., N. Y. City.

"DEAR SIR:—I desire to present briefly my views in regard to the proposal to accept from Mr. Carnegie \$1 000 000 for the purpose of building a joint house for the National Engineering Societies of this country and for an Engineers' Club.

"As the matter now stands, as it has come to me largely through the public press, I am not in favor of the proposition. I do not think our Society should unite in as intimate relations as are proposed, with the other national societies, for the reason that its standing, its requirements and its purposes are considerably different. I need not go into details in respect to these differences. I cannot better express my own views in regard to these differences than by referring to the presidential address of Mr. George S. Morison delivered on June 19, 1895, and found on page 477 of Volume 33. On that page in two paragraphs he shows clearly the difference and brings out, I think, better

than I can possibly do, the reasons why it would be improper to unite in any close relations societies of such different character. He says:

"Our Society should include the choicest minds in every branch of engineering; it must have among its members the leading members of every society which represents an engineering specialty. No other society can have our general range; on the other hand, no other national society can make the same restrictions as to individual requirements. Each of the other societies is devoted to some specific branch of engineering, but the individual qualifications should be comparatively light; it receives into its ranks every engineer working in its specialty, as we receive engineers of every specialty, but not every engineer.

"The American Society of Mechanical Engineers accepts as a member anyone who is 'competent to take responsible charge of work in his department;' it is not necessary that he should be able to design, and while this would be a bad provision for our Society, it is exactly right for the Society of Mechanical Engineers. We take in educated men of every branch of the profession; each other national society takes in every man who is devoted to the specialty which that society represents.'

"These are exactly the relations which exist between the Institution of Civil Engineers of Great Britain and the other societies that have to do with special features of engineering. I cannot conceive of that institution uniting closely with these other societies. I do not believe that any financial temptation—a million or ten million dollars—would be looked upon with favor for a moment by that great Institution, and we are equal to it in every respect so far as requirements for admission, professional standing of the members and other important features which distinguish it from other societies are concerned.

"In 1895, when I endeavored to establish an international institute of engineers and architects, I found that in order to establish any relations at all between the engineers of different societies and of different countries it would be necessary to keep the societies of a high and low grade separate, as they are now, but individual members of these societies could, for the purposes stated in my proposition, be united in an institute, but that it would be necessary to make the requirements for admission as low as possible, and they were to be simply, 'Any person engaged in the profession of engineering or architecture, of mature age and of good character.'

"If it were possible to change the constituent features of the various societies which it is proposed to unite so as to bring them up in requirements, in character, in experience, to the American Society of Civil Engineers, I think the proposition should meet with the approval of our Society, but it is impracticable to change these other societies; consequently we will have to go down to their level, and that we cannot do.

"I hope the views very briefly expressed above and my opinion will be in accord with your own, when the matter has received full study and discussion. I am,

"Yours respectfully,

"E. L. CORTELLI,

"*M. Am. Soc. C. E.*"

MR. CROES.—Mr. President, when this matter was first called to my attention my feeling was one of surprise at the maturity of the



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(continued).

project, apparently, as presented, without any previous notice having been given to any of the parties concerned. On examination, it appeared that an after-dinner speech by the President of the Electrical Engineers appealed to Mr. Carnegie's feelings, and he sent for Mr. Scott the next day and told him that he would like to aid in erecting a union engineering building for the engineering societies. Mr. Scott called in a very few members of those various societies, and although he was told, and Mr. Carnegie was told, that the American Society of Civil Engineers had, for twenty years, been considering the proposition, and had every time refused to enter into a union building, the majority of the gentlemen consulted thought that the thing might be worked out, and so they had gone to Mr. Carnegie and he, thereupon, wrote a letter which you have heard read, to the four Engineering Societies and the Engineers' Club, a purely social and commercial organization, which was then negotiating for the property on Fortieth street, in New York City. That proposition was held by the gentlemen who received it until a site in immediate proximity to the Engineers' Club could be obtained, or options on it could be obtained, so that it might be purchased and be preserved for the erection of a union building for the five organizations.

The property of the Engineers' Club fronts on Fortieth Street, 50 ft. by 99, and the contiguous property which the engineers are to occupy is on Thirty-ninth Street and is 125 ft. by 99. The two plots are backed up against each other. The union building must run through from street to street, with an entrance on Fortieth Street and an entrance on Thirty-ninth Street.

When this option had been obtained, an announcement was made, on May 3d, that such a project was under way. A meeting was called of all the directors of all the various societies concerned, to take place three days later, on the 7th of May; the time was fixed; the place was fixed—the house of the American Society of Civil Engineers. The American Society of Civil Engineers did not know anything about it. On the 5th of May the Board of Direction of the American Society of Civil Engineers met and, finding that a meeting had been called, agreed to invite the gentlemen to attend it, and requested that some members of the Board of Direction attend the meeting to see what was going on. They did so. They found that on three days' notice the Board of Direction was called upon to adopt a set of resolutions carefully prepared, stating that the American Society of Civil Engineers and the other societies, officially assembled, accepted the proposition of Mr. Carnegie, and they also had a cablegram prepared, which was to be forwarded to Mr. Carnegie, that the members of these societies, officially assembled, accepted his offer with thanks.

Some of the members of our Society and members of the Board of Direction were present, and as those resolutions and that cablegram



were entirely untrue, they succeeded in securing the substitution of a resolution thanking Mr. Carnegie.

Now, the proposition which was submitted at that time and presented to that meeting and made public, as I said, three days before, was an elaborate scheme drawn up by a lawyer for the management of the whole thing, and providing for the election of trustees who were to be, I believe, perpetual—at any rate they were practically self-appointed to carry out the whole project.

Without any regard to anything else I will say that that movement was not timely, and one of the greatest philosophers of modern days has said that "our words and actions, to be fair, must be timely." These were not timely. There was not an opportunity given for discussion. Well, that was not passed, of course.

On examination, I found that there were not a dozen members of the American Society of Civil Engineers who knew anything about this, and while there were publications issued, and some of them appeared in the public press, and some pamphlets were sent out, there was not any general information regarding the project which involved the reversal of the policy of the American Society of Civil Engineers from its foundation; and we were told, and it was urgently impressed upon everybody connected with the government of the American Society of Civil Engineers, that it was absolutely necessary that that project should be accepted at once, and certainly within thirty days, because the option on the piece of land which the gentlemen of the Engineers' Club had selected as a good one for the Society house would expire within that time. On inquiry, I found that there was not any such hurry at all; that Mr. Carnegie had said that if any one society did not choose to come into it, that his offer held good for the others; and, as we are not under boss rule, or under clique rule, but are a democracy where every man has a voice in the management of the Society, it was necessary for us to take a popular vote on the subject and to have the approval of all the members.

Well, I thought under those conditions that it would be well to feel the pulse of the men who had taken part in the growth of the Society, men who had built it up and who had held official positions in it and who were more intimate with its affairs than anybody else could be, and so I addressed to a number of them a letter stating somewhat concisely the condition of affairs, reciting in the first place what I have just said to you of the manner in which the proposition was brought about, and then making this proposition:

"It is important that the members of the Society should carefully consider the proposition in all its bearings, and that they should be prepared to uphold the old established policy of the American Society of Civil Engineers unless some very strong argument can be brought forward in support of a reversal of that policy.

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Building  
(continued).

"That policy may, I think, be thus stated: The Society is not an educational institution, nor a commercial exchange, but an association of men who have acquired such an education and practical training in any branch of civil engineering as to warrant their being classed as members of a profession, and not simply as expert mechanics, or skillful tradesmen. Juniors and Associates are affiliated with them, but not on a membership basis, and they have no voice in the management of the Society. The full membership of the Society is intended to carry with it, so far as practicable in any such organization, a guaranty of the mental, moral and practical fitness of a man to be ranked as a professional civil engineer. It is not consistent with the aims and purposes of this Society for it to be associated with other organizations having a lower standard of membership, in such a way as to lead either the members of such organizations or the general public to assume that all the persons so associated stand on the same professional plane.

"It is an indisputable fact that while there are in the various other engineering societies many members who rank as high, professionally, as any members of the American Society of Civil Engineers, and a very considerable number, 250, about, are also members of the latter society, the only reason for the existence of the other societies is that there have been and now are a great many men who feel the need of an Association, but are either unable or unwilling to comply with the requirements of the American Society of Civil Engineers as to full membership and who wish to be members of only such an organization as will accord to them the privileges of the highest grade of membership and participation in the control of the organization."

There always must be a number of societies in the same branch of business, whatever it is, but they are societies of different grades. We have a standard, as Mr. Wallace has well said, which the other societies have not.

"The American Society of Civil Engineers has never been disposed to engage in any business or professional alliance with such societies of such a nature as to lead to a general impression of the equality of the professional standing of all the parties to the alliance. It is now proposed that the American Society of Civil Engineers shall unite with the other technical societies and with also an unprofessional, social and commercial organization in the acceptance of a gift of a building to be occupied by them in common. In the deed of gift all the societies are grouped as co-ordinate and equal. In the scheme of co-operation proposed by the promoters of the project, all the recipients of the gift of the house are designated as tenants in common, share and share alike. The libraries are proposed to be merged in one, and the auditoriums are to be used by all alike. The purchase of the land on which the building is to stand is to be shared in by all.

"Leaving out of view the moral considerations which have heretofore influenced the action of the American Society of Civil Engineers in this matter, and considering only the business features of the proposed arrangements, it appears that, of the five participants in this arrangement, the American Society of Civil Engineers owns and occupies a commodious house, built for its use, which is valued at \$250 000, and has on it a mortgage of \$55 000, which is being paid off rapidly from current receipts. It also has a library of over 40 000 volumes, valued at \$50 000.

"The Mechanical Engineers own property valued at about \$80 000.

The Mining Engineers own no property, have a small library and say they don't want a building. The Electrical Engineers own no property, are understood to have a building fund of \$30 000, and have begun a library. The Engineers' Club owns no property and has no library worth mentioning.

"It appears, therefore, that the one successful, well-conducted and prosperous organization of the group is asked to go into partnership with four other concerns which have not demonstrated their ability to acquire or manage a large property, in the purchase of three-quarters of a million dollars' worth of land, and in the control and management of the million-dollar house.

"This proposition does not proceed from the party in interest which has now cash and credit, but from some of the others who wish to be associated with that party, and who have, at the outset, attempted to enforce an immediate acceptance, saying 'that the details can be arranged afterward.'

"I believe this is a fair statement of the case as it stands, and I would be glad to know from you whether you think it desirable or consistent with the best interests of the Society to entertain the project of an affiliation with the other societies above named in the manner proposed."

I make that statement to you that you can see precisely whether or not I was fair in the statement. I expressed no opinion in it except what comes by inference. (Laughter.)

Now, looking over the persons to whom to send that, I thought that good men to send it to were the eight survivors of the nineteen men who were elected Members of the Society at its revival in 1867—December 4th, 1867—when the Society was revived after being in a comatose state for some ten or twelve years. There were nineteen men elected, and eight of those still survive. One of them took an active part in the reorganization and in the management of the Society, and has been a director and a Vice-President, and has contributed to the funds of the Society by subscription for the building in Twenty-third Street—and right here I might as well say that the building which we own now was not built by subscription. The building in Twenty-third Street was largely purchased and enlarged from subscriptions obtained from members and from others, but the present building was built by the Society out of its own funds, only \$19 243 being contributed by subscription, and it is being paid for out of its own funds (applause); it is not the gift of anybody.

Well, this gentleman I speak of also contributed a fund for founding a prize for the Society, the Rowland Prize, and he is now an Honorary Member of the Society, for I speak of the Hon. Thomas Fitch Rowland, an Honorary Member of the Society; and he wrote in reply a letter which I ask to have incorporated in the minutes of this meeting.

"I had already given the subject upon which you address me, much earnest thought, and have carefully perused your letter, and the printed article, over your signature, copy of which you enclosed.

Letter from  
Thomas Fitch  
Rowland.

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(continued).

"I am firmly of the opinion that it would be a dire calamity to the welfare of The Am. Soc. of C. E., were it to assume any part in the schemes now in vogue, to entice it from its high estate, and signally commanding position of being *the oldest*, most distinguished, and world-wide known Society of Engineers on the Western Hemisphere.

"Were I in proper health, I should most certainly make it my business to visit Asheville, upon the occasion of the coming convention, to do whatever I could, in the way of convincing gentlemen there assembled, that such co-partnership, or 'community of interest,' as has been proposed, would, in my opinion, be fatal to the best interests of our Society, and would be a monumental mistake, that would mark the primal epoch of a departure, from the true line upon which our Society has always traveled, of minding its own affairs, and perhaps might possibly be indicative of the Society's approaching decadence.

"I am unable to travel, and in such indifferent physical condition, as to be debarred from taking active interest in Associations, or other business matters, but I earnestly agree with you, in all your adverse criticisms [Mr. Rowland had also read at that time a letter which I addressed to the public press, in which the same sentiments were expressed, but with an opinion. In writing to the members of the Society, I was careful not to express an opinion. In writing to the Press I was careful to express that opinion as forcibly as I could], and heartily hope The Am. Soc. of C. E., will make no arrangements, to in any way become identified in any co-partnership, or any 'community of interests,' with other Technical Societies.

"Although a third of a century has rolled away, I vividly still remember, the satisfaction and pride with which you and several other gentlemen (who are yet alive) together with myself, accepted invitations, and upon December 4th, 1867, became elected Members of The Am. Soc. of C. E., and ever since, as opportunity has presented, each and all, so far as I can recall to mind, have done whatever they could, to help build up this noble Incorporation, which has long been recognized throughout the business world, as an Engineering Society of the highest type, whose transactions and technical literature, often become consulted by Government Officials, Civic Associations, Capitalists and others, who have been thereby enabled to obtain the best of professional data, and engineering experience of the Society's members.

"In conclusion, I repeat my earnest accord with all of your adverse criticisms, and certainly hope the Society will make no radical change in its status, or general methods of administration, under which it has grown from feeble infancy to its present stalwart proportions."

I place that letter first because it is from an Honorary Member who for thirty five years has taken an active part in the management of the Society, as you know, and because another opinion had been expressed by one of our Honorary Members, Mr. John Fritz. Now, Mr. Fritz, for twenty-five years, while the Society was attaining its present position, never by word or deed gave any aid to the American Society of Civil Engineers, and it was not until ten years ago, after he had passed the allotted life of man and was over seventy years of age, that he applied for membership in the Society. I think that the opinion of that Honorary Member who has taken an active part all the way through is to be preferred to that of one who has taken no part whatever.



I addressed the letter to another one of those eight men, Mr. Charles Paine, a former President of the Society, whom you all know. He replied:

Letter from  
Charles Paine.

"I am of your opinion that the A. S. C. E. should remain free and independent. Its members can enjoy all the advantages of the other societies by simply joining them; and if they wish to lunch at the Club, they will be admitted on the usual terms. The proposal to unite the A. S. C. E. with the other societies could only come from persons who do not conceive the purpose for which the A. S. C. E. was organized. The older members of our Society will know how difficult it has been to maintain the standard of character and to avoid the desire of young (and even of older) members to advertise themselves or their inventions by means of *papers*. Those things are permitted or occur more or less in the proceedings of some of the other Societies; and would affect the estimation in which our Soc. is held, if a near association were established. No scheme for a complete independence of administration has been suggested; if there were such an independence provided for, the A. S. C. E. would have nothing more than it has now, and gain nothing important. The Association for the Advancement of Science, which is every way an important organization, might as well say to the Academy of Sciences, 'let us swallow you, we are more numerous'; or the League of Artists, to the National Academy of Design, 'let us rule your affairs,' as to have the 4 Engr'g associations propose to meddle with the A. S. C. E.

"I am aware that they do not propose this meddling now, except in the joint administration of property; but the same sentiment which makes me prefer to have a separate dwelling for myself makes me prefer a separate home for the A. S. C. E. In my opinion the cause of Engineering as a profession will be served by 1. maintaining the A. S. C. E. independent and free of all entangling alliances."

Another of those first members was Mr. Mendes Cohen, a Past-President of the Society. He writes:

Letter from  
Mendes Cohen.

"Through a personal letter from the editor of one of the technical journals, I learned of the inclusion of the *Engr's' Club* in the scheme. I replied that I could conceive of no possible advantage to the Am. Soc. C. E. of being associated with a social club in a business arrangement of such importance. That on the contrary I saw many and grave objections thereto.

"I had not been well and it did not suit me to prepare my views for publication as I was invited to do, but I am unalterably opposed to such an affiliation, and with that feature fixed as part of the combination I would most strenuously oppose any co-operation in it on the part of our Society.

"I regret that it will not be possible for me to be present at the Convention, where I would be glad to join you in opposing the scheme."

Another was Mr. George S. Greene, Jr., for many years Engineer-in-Chief of the Dock Department of New York City, and a Past Vice-President and Treasurer of the Society, and you may see that the questions on which I asked his opinion are distinctly stated in his preamble.

Letter from  
G. S. Greene,  
Jr.

"You ask for my opinion in regard to the American Society of Civil



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(continued).

Engineers joining with three other technical Societies and a social club in the ownership, control and management of a home in this city.

"The American Society of Civil Engineers is the oldest and it is the most dignified of the technical societies considered, in that it has a high standard and requirement of eligibility to full membership, while at the same time it is broad enough to embrace all classes of members that the other societies include.

"It has its own house, under its own control, sufficient for its purposes and capable of enlargement when there is need.

"It has its own library under its own control and management.

"It is not in any pressing need of money.

"It is independent, and the leading society.

"It is proposed that it become one of five in the occupation, control and management of a house and of a library for the sake of the advantage of whatever share of one million of dollars, (less whatever it may have to pay for land), may be allotted to it by the majority vote of four other societies and itself.

"It cannot become one of five without losing its independence, its prestige and its leading position, and thereby decreasing its ability to benefit the profession, and the commonwealth. It would lose much and gain but little if anything consequential.

"Whatever the other societies may do, I hope that the American Society of Civil Engineers will maintain its present position."

Letter from  
Henry G.  
Morris.

Another was Mr. Henry G. Morris, of Philadelphia, an engineer, machinist and mechanical engineer. He said:

"I agree with the general terms of your position as to the desirability of entering into a business partnership with other organizations, as has been proposed.

"The action of the Board in appointing a Committee to investigate the proposition, seems to have been well taken, and, of course, as a democracy, the members will bow to the opinion of the majority, when the results are expressed by the ballot.

"If there is any intention of having 'Carnegie blown in the front'—as remarked by Mr. Dooley in his article on Carnegie Libraries—I would certainly strongly object to a combination such as proposed.

"I much regret that I will not be able to be at the Convention at Asheville, but I feel satisfied that the older and conservative members of the Society will be well represented."

Letter from  
Edward P.  
North.

Mr. Edward P. North, a Past Vice-President, and one of the original eight, wrote as follows:

"When you honored me with your communication on the affairs of the American Society of Civil Engineers, you knew that for more than 20 years I have advocated making provision in the Society house for the special engineering societies, but without putting in peril our eminently respectable position or capital. The generous offer of Mr. Carnegie may make some combination between the four national technical societies possible in the near future.

"On the other hand, I fully agree with you that allowing a non-technical club to intervene in the affairs of the American Society of Civil Engineers is impossible. And the plan for 'a suitable Union Building for them all' should be so modified that the affairs of the Engineers' Club are permanently segregated from those of the American Society of Civil Engineers. Nor do I fully approve of the pro-

posed proximity of our meeting room with a club house, which, while it may not be injurious to men of mature years and well-established habits, does not seem desirable for those younger men who are just entering their profession and whose attendance at our meetings has so far proved beneficial.

Writing from my standpoint, as desiring an advantageous arrangement between the four national societies, it seems the first thing is to settle its practicability and then settle the forms and terms of the co-partnership. When planning work for which there is no precedent, all possible difficulties should, as far as possible, be foreseen and provided against, and these provisions should be criticized by one who has not made the plan.

This proposed partnership involves a problem with which we are all inapt. It is an absolutely new proposition, out of our experience, to be governed by the laws relating to associations, in which laws few or none of us are expert. And safeguarding the rights of the parties to the real estate and the proposed common house standing on it will probably present questions for which there are no legal precedents. It was with these difficulties in view that at the meeting of the 7th inst., to which you refer, I advised that before any of our capital was merged in a common undertaking, a sum at least equal to one year's income on that capital should be expended on legal advice.

"With these views I am obliged to return a qualified answer to your question, viz.: I do not think it is desirable or consistent with the best interests of the American Society of Civil Engineers for it to entertain the project of affiliation with the other societies above named in the manner proposed. But, after the terms of a possible affiliation between the four technical societies have been arranged under competent legal advice, I think the proposition should be submitted to the Society. The project is too important to us, its disadvantages too patent, and its advantages too doubtful for the hurried action wished by some.

"While I am unable to agree fully with all of your views, I think all the members of the Society should read them, and hope the fact that you are a member of the Board will not prevent your asking the Board of Directors to give your communication publicity in the Society."

There is yet another one of those early members who was at one time, for a couple of years, the Secretary of the Society, Mr. Alfred P. Boller. You all know him, and I don't think that any of these men whose letters have been read, while they are old members, can be said to be "veterans who lag superfluous on the stage," because they are all still actively engaged in work. Mr. Boller wrote:

Letter from  
Alfred P.  
Boller.

Answering your favor *in re* the momentous step proposed to the Society looking to a partnership arrangement with its sister Engineering Societies. The subject has been much in my thoughts, and between the conservatism natural to a veteran, and a recognition of progress as a law of healthy development, I find it hard to come to a concrete conclusion. The project has much to commend it, and if wisely carried out, will I think strengthen a public appreciation of the professions on which modern civilization has been built up. Our Society has had a phenomenal career and has been built up on a standard of membership that is unique among Am.

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Societies, and which has put us in the front rank. Further, we have been wisely financed until our resources have become most substantial, and increasing steadily. We ourselves do not need the gift, and will continue to grow as long as the present policy and traditions of the Society are maintained, and the first impulse is to let well enough alone. Is there a broader view and a responsibility to the profession of Engineering as a *whole*, of which we are now practically only a subdivision? I think there is, and am inclined to endorse a great Union Building on certain conditions, having in view our greater financial responsibility, which is fully twice as great as all the other Societies combined.

"1st. Our position as the representative Society of Civil Engineers must be maintained, just as it now is.

"2d. The ground rent (Mt'ge) while probably safe in Carnegie's hands, after he is gone may be a source of future trouble—unless he makes a provision that it shall never be made a danger ground for the 'combination.' If this can be done, it goes a long way toward eliminating the financial inequality and unequal responsibilities of the Societies.

"3d. Absolute separation from the Engineers' Club or any mixture whatever with that Social organization that would group it as one of the 'Engineering Societies.'

"The fund must be absolutely separated, so that the Engineers' Club does what it likes with the part dedicated to its purposes, and the Engineering Societies with theirs. The buildings must be separate and distinct, and in no way mixed up. The Engineers' Club as such must not be in the Board Trustees or management of the Societies' building. I am strong in my opinions as to this branch of the subject, as the Engineers' Club seems to be very aggressive in instructing the Engineering Societies what they should do, and manifest an expectation of being established as a collateral branch of the Technical Societies. Of course it would be a mighty good thing for the club, but should be guarded against. As a matter of fact I have never been more puzzled as to just what we should do. I hate the thought of giving up our building and separate independence, but the younger men and changed conditions must be fairly considered. But I would make it a '*Sine qua non*' that the conditions of the ground rent should be such that at *no* time could the property be foreclosed, nor the Societies ever be restrained in the full enjoyment of the building, should conditions at any time arise, interfering with the paying of interest either in whole or in part."

Letter from  
Thomas C.  
Keefer.

I further sent this letter to the Past-Presidents of the Society who are living, and had not already publicly announced their conclusions, as I thought they were men who ought to know something about it, and have opinions that were worthy of consideration. In reply Mr. Thomas C. Keefer wrote:

"I agree with your view of the position. You have nothing whatever to gain and very much to lose in such a merger. It would be like abandoning a Home for a Hotel.

"There is nothing, not even a Library, that you could afford to hold in common with other independent bodies, as there would be sure to arise dissension out of the joint use of apartments held in common.

"We have succeeded in having 'thrown out' by the Private Bills Committee of Parliament here, a Bill to incorporate a 'Dominion



Institute of *Analyticated Engineers* by showing that the Canadian Society provided, as does the American, and the British Institution, for all classes of Civil Engineers."

Another Past-President, Mr. Octave Chanute, wrote thus:

Letter from  
Octave  
Chanute.

"My first impression was that the American Society of Civil Engineers might lose so much in disposing of its present building, that it was so well provided for and so well off financially, that it could afford to abstain from participation, and thus allow other Engineering Societies not mentioned, such as the Naval Architects and Marine Engineers, the Military Engineers, the Engineering Education Society, etc., etc., to avail, with the three other National Societies mentioned, of Mr. Carnegie's magnificent gift, for which all members of the Engineering profession must be profoundly thankful.

"My second thought was that the holding aloof by the American Society of Civil Engineers might impair Mr. Carnegie's intentions, and that the first requisite step would be to learn his views.

"Your statement that the proposal involves the purchase of half a million dollars' worth of land by the connected organizations further modifies my opinion. Moreover, I see in *Engineering News* of May 21st, just received, that a Joint Conference Committee of the Societies interested has passed certain resolutions recommending action by the several organizations, and that the plan involves a separate building for the Engineers' Club. I do not understand that it is proposed to merge all the different Societies into one, but that the proposal is that the National Societies shall occupy one common building, and the Engineers' Club another. It seems to me that acceptance depends upon the adequacy of the scheme to be devised for the ownership and management of the property to be acquired. The schemes hitherto suggested may be objectionable, but I think one can be devised.

"I believe therefore that an effort should be made in that direction. I am little in sympathy with the feeling that any one Society has a higher professional standing than another. Existing facts and conditions will, however, have to be recognized, and indeed, I believe that those enumerated by you would warrant the American Society of Civil Engineers in taking the lead, even if this involved some pecuniary sacrifices on its part. I am glad to note that the first step recommended is to obtain plans and estimates from Architects for the buildings.

"I believe that the land for the Engineering building should be owned by a separate corporation, whose stock should be taken in such ratios as may be agreed upon by the various societies in interest, in view of their probable use or financial ability. That each society should remain entirely independent in managing its own affairs. That each should occupy so much of the building as it actually needs, with proper regulations as to the alternate use of the larger auditoriums which would be but seldom occupied. That the libraries should be kept separate, but with provision to make the books accessible to members of the other Societies. That each should pay rent upon so much of the building as it uses. That other Engineering Societies should also be admitted by joint consent, and should also pay rent. That provision should be made for the future growth of each Society and consequent changes in the accommodation required. That inasmuch as not all the available space would be needed at first, and as the annual interest and taxes (for I do not believe that the latter could or should be avoided) might aggregate more than the present interest, taxes and rentals incumbent upon all the Societies put together, the

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surplus space should be rented to Engineering tenants acceptable to the Societies. That the profits should be kept small, and that, if any, they should be divided back among the stockholders (the Societies) of the new corporation, which might be managed either by directors elected in the usual way or by trustees appointed by the various societies upon some agreed basis.

"This is but a rough-cast scheme, made on the spur of the moment, and I hope that a better one will be produced."

Mr. Chanute's idea, as you see, involves a much more comprehensive scheme than the one now proposed. He suggests a huge building enterprise in which the American Society of Civil Engineers shall take the lead and enter into a speculation foreign to the purposes for which it is organized, and involving the expenditure of a much greater sum than is now proposed to be placed at its disposal.

Letter from  
Wm. Metcalf.

Mr. William Metcalf, another Past-President, wrote as follows:

"I am heartily in sympathy with your views as far as they deprecate any move that would jeopardize the independence and the high professional standing of the Am. Soc. Civ. Eng. Would it not be possible, however, to safeguard the standing of the Society and at the same time secure better located and better quarters in a great center of engineering activity?

"The most serious mistake in my mind is the including the Engineers' Club in any way. It seems to me that that feature is ridiculous. As to opposing any arrangement for a general engineering center, that would come with a bad grace from a Past-President of one of the other societies and a Past Vice-President of the third.

"I think you ought to publish your views in *Eng. News* and not let the argument go all one way."

The next of our Past-Presidents, in chronological order, is the distinguished ex-Chief-of-Engineers of the United States Army, Gen. William P. Craighill, whom the Society was glad to honor by admission to its roll of Honorary Members, seven years ago, after eleven years of active participation in the advantages of membership. I have seen a letter from Gen. Craighill opposing the present scheme, and supposed that it would be presented here. In response to my letter, he wrote:

"I have been away from home and otherwise prevented from writing a suitable letter on the subject of accepting the Carnegie offer, but I am quite willing to be quoted as preferring a separate establishment for the Am. Soc. C. E., just as I think it best for my family to live in its own house and be independent, if possible."

Mr. Alphonse Fteley, another Past-President to whom I wrote, preferred to send his communication directly to the Board of Direction. You have heard it read by the Secretary.

Letter from  
Robert Moore.

Mr. Robert Moore, another and the latest of our Past-Presidents, wrote:

"When Mr. Carnegie's offer was first announced, I had the feeling that so generous and munificent a gift ought to be accepted if we could possibly do so.

"But as I have thought of it since then the probable or even possible gains to the Am. Soc. C. E. by the proposed union have become



more and more shadowy whilst the losses have grown in certainty and importance.

“ Amongst the gains is a larger and more imposing meeting room and the ability to more readily meet the members of the other engineering societies. The larger meeting room, however, will hardly be needed by us except once a year at the annual meeting and this need can be more cheaply provided for by the use of Carnegie Hall or by an additional story on our present buildings. And to afford opportunity for meeting members of other societies is now the special function of the Engineers' Club and hardly anything else seems to be called for.

“ On the other hand, by the plan proposed, the Am. Soc. C. E. will be obliged to give up its present home, over which its control is absolute, and take other quarters in which it will have only a one-fifth interest and in which its movements will always be subject to complication and control by others whose views and interests will not be the same as ours and may be adverse.

“ The merger of the libraries of the different societies which has been suggested is, as I think, distinctly undesirable. On this point we in St. Louis have had a good deal of experience. The Engineers' Club which started out with its own library made, some years ago, an arrangement with the Public Library by which the latter, in consideration of the payment of a large part of the annual dues of the Engineers' Club, and the placing of its books in the Public Library, agreed to furnish to the Club a meeting room and buy such engineering books and periodicals as the Club might designate. After a number of years' trial the arrangement proved unsatisfactory and the Club withdrew from it, but without being able to withdraw its own library. A similar arrangement was then made with the Mercantile Library. But after a few years' experience this too proved a failure, and the Club withdrew to quarters of its own and began again the formation of its own library, which it is not likely ever again to give up. The Medical Society and the Academy of Science of St. Louis have had experiences which, though not identical with that of the Engineers' Club, teach the same lesson, viz : that the small special library fills a place that can be filled by nothing else.

“ In the same way I think that anything looking to a merger of the different engineering societies would be a serious if not fatal mistake. The fact that these younger societies have been organized indicates that there is a sufficient reason for their separate existence which any sort of organic union would defeat. But unless there can be an organic union the proposed union building will tend to promote dissension rather than harmony. It is a matter of universal experience that between different families harmonious relations are best promoted and maintained by not living under the same roof.

“ From the standpoint of the Am. Soc. of Civil Engineers, therefore, I can see no advantages which will compensate for the loss of our own home and our complete autonomy.”

In a letter just received from Mr. Moore, which the President has handed to me for use in this connection, he says under date of June 7th:

“ Though disposed to find reasons for accepting Mr. Carnegie's generous offer, I have been unable to do so.

“ We are in such a good condition now that we have much to lose. If the several societies were united in one great organization I should

Letter from  
Mr. Moore.

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say at once that the new building was just what we want. But such a Union of the societies is impossible and on the whole, I think, undesirable.

"But without an organic union the proposed housing in one building not owned by either will I think be an entangling alliance that will produce friction and discord and not harmony. It is the sort of experiment which with different families is almost sure to be disastrous."

I also wrote to Mr. John Bogart and Mr. Francis Collingwood, Past Secretaries. Mr. Bogart has replied by telegram to me here advising careful consideration of the questions by the Board of Direction and its submission to a letter-ballot of the Society.

Letter from  
F. Colling-  
wood.

Mr. Collingwood wrote:

"At first thought the prospect of a magnificent building devoted to the uses of the several Engineering Societies is very captivating.

"I can see, however, that in the case of our Society it *might* be obtained at too high a price, even though there is no actual outgo.

"There is much in the absolute quiet and restfulness of the present building which could hardly be maintained in the one proposed.

"The merging of the libraries, while enlarging the scope, might not prove an unmixed blessing.

"The several Societies being placed on a par, in so far as the ownership and occupation of the building are concerned, certainly would have a tendency to lower, in the eyes of the community, the standing of the Society as regards the professional qualifications required in members.

"The one thing that seems attractive in the scheme is the provision of a meeting room large enough for all occasions. Our own room is already too small at times of Annual Meetings. For everything else there is room enough where we are for some time to come.

"Large caravansaries are never favorable to study and useful thought; and I think we should know fully the complete details of the new scheme and be able to study it in all its bearings before coming to a conclusion."

I also wrote to the living Past Vice-Presidents of the Society who had not already publicly expressed their opinions, and received replies as follows:

Letter from  
Joseph P.  
Davis.

Mr. Joseph P. Davis, one of our most honored members, noted for the judicial quality of his mind, wrote thus:

"In my opinion it would be a fatal mistake for the Am. Soc. C. E. to enter into any partnership with other Societies for joint ownership of a building.

"I cannot imagine that the thought of doing so will be entertained by any large number of its members.

"We do not wish to be submerged. Your arguments against such action are sound."

Letter from  
Chas.  
Hermany.

Mr. Charles Hermany, an old and honored Past Vice-President, wrote thus:

"Your letter contains the first correct information I have received upon the subject. By this I do not imply that that which has been already printed is incorrect, but I must be permitted to consider that some of it has been premature, if not irrelevant; in fact, the

oracles seem in some cases to have left their temples, and upon the hustings and in the daily press have tendered their auguries with a freedom and profusion which fails of admiration. Someone should call these divinities back to their temples on Broadway and to those in other marts of our country.

"The commercialism which has in recent years dominated to some extent the engineering profession in its various activities has heretofore, and does now, threaten the survival of the professional engineer, pure and simple; and while this present movement, following closely upon the after-dinner speech of Mr. Scott, may not be a stroke of radical commercialism aimed at what to men of your and my experience is professional character, it is, nevertheless, for the time being, to be parried as such.

"My present inclination is to let the matter rest, with a grateful acknowledgment to Mr. Carnegie for his offer, which was undoubtedly prompted by the best of motives; at the same time, such a course would be a conservatism, the wisdom of which would be questioned by many, especially the younger members of our society. It behooves us, therefore, to consider the matter carefully, and I do not know but what it might be wise to have the question discussed at the Asheville convention. Moreover, we should always bear in mind the valuable contributions to practical engineering literature that have come out of almost pure commercialism in engineering.

"Inasmuch as we have had less than two weeks' time to consider this movement publicly, and because of my other engagements, I am not fully informed nor prepared to write more definitely upon the subject. In brief, I consider the movement in character similar to those made heretofore, but one of infinitely greater potentiality, and one that we cannot consider as a trivial event. It would take the prescience of a seer to perceive and express all that seems to me involved in this present movement."

That sums up this question of commercialism in professional engineering. The commercial element is very strong in some of the societies to which it is proposed to give a union building. They are technical societies, it is true, but there are many members who are inventors and manufacturers and dealers in commercial articles who do not take the professional view that the civil engineer does, and cannot take it. Now, at our conventions and at all of our meetings we have carefully excluded anything in the way of commercialism. We do not allow in the *Transactions* papers especially advocating personal interests. We do not allow, at our conventions or meetings, inventors or manufacturers to exploit their wares and solicit custom.

That is done at the American Water Works Association, which is very similar, in some respects, to the other societies, and I do not know why Mr. Carnegie did not include that in his gift, unless there were no members of the Engineers' Club present at that time who were members of the American Water Works Association; but we have always excluded that, and we do not want to have an intimate association with that class of society, nor do we want to have rooms provided in the building for the display of commercial products. We do not want to have the prevailing sentiment in that building such as exists in the Engineers' Club, and concerning which

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a prominent member of our Society, and a member of the Engineers' Club, and the Chief Engineer of a large enterprise, told me a few days ago that he had been a member of that club for some time, but he did not go there now because he wanted to get away from business when he went to a club; that he wanted to enjoy himself, and if he went into the Engineers' Club he had somebody running at him and trying to sell stop-cocks, or rails, or bolts, all the time, and that is the condition that it would get into, and you cannot get away from it.

Mr. Carnegie does not give this thing to one or two or three or four; he gives it to the five for a union building for them all, and they cannot divide that building under that deed. It is preposterous to suppose that under that deed the building can be kept entirely separate, when it is a Union building which is to be erected, so that the proposition made by Mr. Carnegie now is not one which the American Society of Civil Engineers can accept in any way; and that proposition is addressed to us personally and not collectively—by personally, I mean to the Society alone, to the American Society of Civil Engineers.

Now, this Society, it seems to me, must and ought to address to Mr. Carnegie a respectful letter stating that they acknowledge his gift with thanks for the kind feeling expressed, but that the whole sentiment and reason for being of the American Society of Civil Engineers forbids it to be associated on the same terms with a purely commercial and social organization. It would be up to Mr. Carnegie then to say what he wanted to do, and I have no doubt at all that Mr. Carnegie would see it, because he is a good business man himself, and he has associated a great deal with professional men, and he knows professional feeling; but he would see, if that was put before him, and brought before him in that way, that we were right and that he had been misled in this offer. The offer as it stands now, however, is not one which the American Society of Civil Engineers can possibly accept at all until the terms of the gift are changed.

Letter from  
Samuel  
Whinery.

Mr. Samuel Whinery, who was Vice-President in 1893, writes as follows:

"In the first place, the whole scheme is yet too vague to enable anyone to form an intelligent opinion upon the subject. We need to know in considerable detail the plan it is proposed to carry out. Particularly is it necessary to know what responsibilities the Society is expected to assume, and what liabilities it will incur by joining in the project. While we may indulge in some sentiment upon the subject, it must be considered primarily as a business transaction and upon its merits. The Am. Soc. C. E. has heretofore followed a wise and conservative policy which has resulted in a large degree of business prosperity. It cannot now afford to change that policy, in order to accept this magnificent offer of Mr. Carnegie. It must consider the matter deliberately and fully, and this will require no little time even after all the necessary data are in hand.

"The idea of the project is attractive and it seems reasonably cer-



tain that our Society would be benefited in a number of ways if it could be carried out satisfactorily. On the other hand, it is certain that the plan will be in many respects disadvantageous to the Am. Soc. C. E., however beneficial it may be to the other Societies. It is not possible for me, with my present information, to strike a balance or to determine on which side of the account it will be.

"As a general proposition I am inclined to favor the project. Furthermore, I think that our Society should be willing to make some sacrifice in the interest of her sister societies, provided the sacrifice be not too great.

"I should strongly oppose anything like an organic or even working union of the societies. I would make it a cardinal requirement that our Society must maintain its separate and independent existence just as it does now. The relation of the several societies would then be simply that of joint tenants of the proposed building. I do not see how such a relationship could seriously affect the character and standing of the Am. Soc. C. E. or lower its standards and dignity. We would continue to be the same society under the same management as now, but the location of our headquarters would be changed, and we would have in the new location certain increased facilities, such as a commodious hall for large meetings, and a good restaurant close at hand from which refreshments could be served, and where members could conveniently get good meals.

"With the stipulation named above—complete independence of organization and management—the question to be discussed is, as I said above, one simply of business and expediency.

"What will be the cost of interest and maintenance?

"What disposition can be made of our present house?

"If sold, how, and upon what terms can the proceeds be invested?

"To what extent will the Society incur actual and contingent liabilities?

"Will the new location be better or poorer than the present one?

"Will the advantage of a joint building and the facilities it will offer, overbalance the disadvantages of the change?

"These are to my mind the important questions to be considered; and they cannot be intelligently considered in the present embryotic state of the scheme. What we need now is a definite detailed project of the proposed enterprise, upon which to base opinions."

The writer of this letter is clearly not in haste to accept the gift and postpone scrutiny of its details.

I do not wish to tire you or detain you. There are not many other letters, except these. We have been told that the sentiment of the East was unanimously in favor of this proposition.

Mr Samuel M. Gray, of Providence, is a Past Vice-President of the Society, and he writes:

"I feel indebted to you for favoring me with so clear and impartial a view of the proposed 'merger' project.

"Certainly, all must appreciate and applaud the noble, disinterested, and philanthropic spirit which has prompted Mr. Carnegie to make his munificent offer; and it must assuredly give to the societies needing and meriting assistance, a newness of life; fresh encouragement in the fulfillment of the objects and purposes for which they were organized, and that they have been able but partially, perhaps feebly, hitherto, to attain.

Letter from  
S. M. Gray.



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"But while this may be true, and doubtless is, regarding one or more, perhaps all, of the other organizations you mention as beneficiaries in the scheme proposed, it cannot be said to be so of the American Society of Civil Engineers, and I desire to say that I believe the American Society has but little, if anything, to gain and much to lose by favoring the 'merger' proposition."

Letter from  
Chas.  
Macdonald.

Mr. Charles Macdonald, a Past Vice-President, says:

"I have read your letter with a great deal of interest and have given it the most careful consideration.

"Let me say, in the first place, that I consider you have not only presented a 'fair statement of the case,' but an admirably clear and logical description of the relations which exist, at the present time, between the organizations referred to. Nevertheless, I am compelled to urge upon you the importance of wisely and patiently investigating the possibilities of the future development of the profession, before committing yourself to the belief that the American Society of Civil Engineers will always hold first place. For my own part, I have never held to the belief that the Engineer required any qualifying adjective to designate his rank. In the earlier stages of development, it is true that the necessity seemed to exist for a proper distinction between the designer and constructor of Engineering work and the skilled mechanic who could operate it, and as such Engineering work was in general carried out on commercial lines, it was natural that the constructor should be called a Civil Engineer, as distinguished from a Military Engineer, or from the mere mechanic, who operated the work, after construction; but in the process of time, it has become evident that the differentiation of activities grouping themselves under the general head of Engineering, cannot be for long restrained, under any designation which does not permit of the most comprehensive title, for the man who utilizes the forces of Nature for the benefit of his fellow men. Up to within a century, we have been utilizing forces of Nature, which were of comparatively simple application, but with the invention of the steam-engine a new line of activity presented itself and now the Mechanical Engineer has acquired a right to the use of a qualifying adjective, so long as such distinction is considered necessary. Later came the utilization of electric energy, of which we are as yet but upon the threshold. Judging, however, by the tremendous strides made of late, who shall say what the future of that branch of the profession shall be and whether the infant society of to-day shall not over-shadow all the other societies, in the near future?

"I, for one, do not feel like taking the risk of waking up some day and finding the dear old A. S. of C. E., which you and I have helped to build up, forced into the background of Engineering progress, by a child of to-day, but a child endowed with all the power and potency of illimitable growth, and the sooner we recognize it the better. Now, you will naturally say, what scheme have you to suggest, whereby this offer of Mr. Carnegie can be turned to the best account. This is not an easy question to answer and I have not had time yet to consider all the reasons *pro* and *con* involved, but I can see in my mind's eye, deeply engraven in stone, over the capacious entrance to the building which is to be, the superscription,

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and I am firmly convinced that the leading men of our several organizations will be able to work out a plan under which each may maintain

its individuality in this temple of applied science, and yet all will work together, for the general good of the profession, which we love so well."

Now, the difficulty about Mr. Macdonald is that he does not understand, or he has not got the meaning of civil engineering. It is not engineering with an adjective. It is as the Germans write it: it is "Civil-engineering," all one word, and "Civilengineering" is what Thomas Tredgold said, in his well-known definition, is the art of directing the great sources of power in Nature for the use and convenience of man. Now, that includes all the branches of engineering, and the term "Civil Engineering" is not, and is not generally understood to be, applicable to any one branch of the profession of civil engineering. The tendency is, I know, among certain classes, among men who are not members of this Society, to say that the civil engineer is simply a man who does not belong to one of the other special societies: that is, he is not a mechanical engineer, or an electrical engineer, or a mining engineer, when he is a civil engineer. That is entirely incorrect, and the general impression, the general sentiment of the profession is not as thus expressed. I don't know what would happen after the development of the electrical engineers, but I think Mr. Macdonald looks forward to the day when the American Society of Civil Engineers will be "dissolved into a multitude of revolving electrodes," which Sir William Crookes thinks will be the fate of all matter.

To show you that the sentiment of the Society is not so universally in favor of this movement, I will read a letter from a Past Vice-President of the Society, in the State of New York, Mr. Robert Cartwright, of Rochester. He writes:

"I am heartily in accord with your views in the matter. As a Society in this country, we are the only one that I have any knowledge of, that insists on maintaining a standard by which to regulate the acceptance of its members as being qualified for such position. To preserve that standard intact has always been my aim in my official connection, so that its status should be maintained among the best organizations in Europe or elsewhere. To be affiliated with the A. S. C. E., it is not enough that a man should be a good fellow, as is the case in some societies, but that by his professional experience and his integrity, he should be found worthy by his professional brethren and be honored by being elected to membership in the Society, based upon a standard or rating as required by the A. S. C. E. Letter from R. Cartwright.

"I honor Mr. Carnegie for his disinterested generosity in his efforts to benefit his fellow men, and can see how self-appointed, interested parties might make an appeal to his better nature that would impress him favorably, but I cannot endorse a project that embraces all kinds and conditions of societies, whose only claim to recognition is a body organized under some scientific appellation, and whose members are absorbed without any regard to a standard of merit. As you justly say there are many men in such societies who are the peers of any in the A. S. C. E., in capacity, in integrity, or in financial standing, but so long as they are not selected on a basis as high as that required by us, it certainly would not be equitable that we should go into partnership

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 building  
 (continued)

with them. The Engineers' Club is purely a Social Club and I can't see that they should become participants in Mr. Carnegie's generous plan. Our A. S. C. E. is an organization that is recognized by the whole civilized world as a power. We have our library and our property and are self-supporting, and it does not strike me favorably that we should lower our standard of qualifications and throw all this into a common fund to be participated in by all societies, however ephemeral or social or scientific, that may from time to time come into existence. Our Society is made up of material from all branches of the engineering profession as evidenced by our Constitution in Article II, Section 2, and is certainly broad enough to take in any person possessing the necessary qualifications. We are either something or nothing, and I should emphatically oppose our being merged into a conglomerate mass that is made up of any and everything, named by the promoters for the purpose of being fostered and supported by the large-minded, generous Andrew Carnegie. I honor him intensely and I believe were the thing properly presented to him, he would so perfect the scope of his donation that its future would be a great one, calculated to improve the profession and still retain the exclusiveness pertaining to ability and integrity. When his beneficence absorbs social clubs, *et al.*, it certainly would not confer any honor to become a participant.

"I regret my inability to attend the Asheville meeting in order to participate in a discussion of this subject, but I think that the sober common sense of the A. S. C. E. will result in a just solution of the question."

After writing that letter, Mr. Cartwright thought it would be a good thing to see what the Rochester contingent of the American Society of Civil Engineers thought of it, and they all signed it.

"We heartily concur in the foregoing."

" JUSTUS HERBERT GRANT, M. Am. Soc. C. E.	
" WILLIAM E. HOYT,	" " " " "
" J. NELSON TUBBS,	" " " " "
" JOHN F. ALDEN,	" " " " "
" W. N. RADENBURST,	" " " " "
" GEO. W. RAFTER,	" " " " "
" LT. GRAND BROWN,	" " " " "
" J. Y. MCCLINTOCK,	" " " " "
" E. A. FISHER,	" " " " "

Mr. P. A. Peterson, of Montreal, another Past Vice-President, writes:

"In regard to the amalgamation of the various bodies of Engineers and others of the City of New York, consequent upon the offer by Mr. Carnegie of a million dollars to put up a Union building, I am very much opposed to such an amalgamation as I can not see what the Am. Soc. C. E. is to gain by it, and I can see very much what we shall lose—viz., the management of our affairs, and the prestige which we have gained which should be enough to keep us out of any scheme of Union unless the terms are very different from what I suppose them to be."

Mr. George H. Benzenberg, Past Vice-President, writes thus:

"I do not yet fully understand to what degree these Societies are to unite to carry out the proposed merging of their property interests,

Letter from  
 G. H. Benzenberg



and whether the affiliation is to be of such a nature as to partially obliterate their characteristic individuality.

"Should the scheme contemplate this latter proposition, in other words, remove the restrictive requirements of this Society, I should think that not any of its members would consider such a scheme seriously. If it is proposed that each of the five associations shall contribute one-fifth towards the purchase of the real estate necessary for the building, it seems to me the burden might become too great for some of them to assume, while, if the property is to be paid for upon any other basis, the tax might become too great for the others, besides which the unequal interests thus created may in time, with the more rapid growth of one or the other, become unsatisfactory. These matters must all be considered so as to guarantee such an alliance to be as satisfactory to all parties concerned in the future as well as at the present time, as the partnership cannot hereafter be dissolved without sacrifice to one or the other party.

"No definite action towards entering this combination should therefore be taken by this Society until it is definitely established upon what basis it is to unite with the other Societies, what obligations it is to assume and how its interests, if acquired, are to be protected and administered. Every member has a personal interest in this question and should be permitted to voice his conclusions after having been fully advised as to the proposition and the obligations assumed.

"It is quite natural that a difference of opinion should arise among the different societies regarding this matter as well as among the members of our own Society, notwithstanding each has the best interests of the Society in mind and is entirely sincere and unselfish while formulating such opinion.

"The whole subject at present is undoubtedly surrounded by a great deal of pardonable sentiment, but before long it must naturally resolve itself into a simple business proposition, and in order that the alliance, if contracted, may always, individually or mutually, be fair, comprehensive, agreeable and beneficial as well as permanent, it is necessary that it be given unprejudiced and deliberate consideration before any entangling obligations are assumed by any of the parties.

"The question cannot justly be disposed of as if there were nothing at stake aside from participating in a most generous contribution. Joint financial interests are not always conducive to maintaining the most pleasant or friendly relations, unless they are previously well defined and determined.

"It seems to me the most vital question is not as to what convenience may be secured to the Societies and their members through the munificence of a generous admirer of the engineering profession, but what can be done to permanently advance the interests, standing and recognition which is due to it.

"Careful, deliberate and exhaustive investigation previous to arriving at conclusions is the safeguard of successful Engineering. I would suggest that this principle be applied here as well, as there is certainly no haste required in this matter. If it is a good thing it will keep."

The last letter to which I will ask your attention is from Mr. Rudolph Hering, a Past Vice-President. He writes:

Letter from  
Rudolph  
Hering

"The acceptance of the generous gift of Mr. Carnegie, as I stated, is no more degrading to our Society than a similar gift to Universities

and other institutions of learning. I think it is hardly fair to say that our Society is not an educational institution, but an association of men who have acquired such an education.' What is the purpose of a library except for spreading knowledge and learning, and why do we read papers at our meetings and publish them, except to instruct our fellow members regarding our own research or experiences? I confess that I have never attended a meeting without learning concerning some engineering work, and whenever this education among our members should cease, our Society, it seems to me, would become a mere social club. Although such a club is excellent in itself and for its special purpose, I trust that to adopt its functional character will never become the policy of our professional Society, which has for its main object 'the advancement of engineering knowledge.'

"The second point of your letter is the statement that it is inconsistent for our Society to be associated in the same building with other organizations having a lower standard of membership. I fail to see that it is in any way harmful to a member of any branch of the profession to associate with others who are either younger, less experienced or less well informed in our own special line of work than we are ourselves. He whose mind is open to advancement will find instruction from every progressive and freely developing mind, even though younger and less experienced. You write that the general public will assume that persons so associated in the same building must necessarily all stand on the same professional plane. I think this will be no more the case than the assumption that the members of any single one of our societies all stand on the same plane, although enrolled in different classes of membership.

"Very few engineers who do not wish and expect to be improved in some ways by their new associations ever join a professional society; all but very few will advance by the new intercourse. If the American Society of Civil Engineers maintains the highest grade of membership, I think a closer association with other societies would have the effect rather of gradually drawing the grades of others upwards than ours downwards. Since the birth of our own, the oldest of the societies, this gradual upward tendency has been quite apparent in its successive constitutions, and the highest limit I hope has not yet been reached. The other societies will no doubt develop the same tendency and, consistent with the more rapid recent progress in engineering, they may develop even more rapidly than we did when younger.

"The proposed union is limited practically to the housing and to the material and social interests. It is not to be extended to the professional interests and professional work. Therefore, I do not see any fundamental difficulty in gathering the several branches of engineering under one roof and yet preserve the fundamental characters of the respective constitutions.

"The only difficulty, I believe, lies in the business aspects of equitably dividing and arranging the respective properties and of their management. Mr. Carnegie proposes to divide his donation equally among the societies, which would have the effect of increasing the present property of each one by a definite sum. The American Society of Civil Engineers being at present the largest and wealthiest of the several societies, could by adding from its own funds have the largest quarters and any special conveniences which it desires and for which it can pay. It would own for itself just what it puts into the new and common property. The libraries and much of the other present properties could remain as now with each society. The auditorium common



to all the societies could be made larger, handsomer and more suitable than is possible if each society had a separate house. It would be used more frequently, be the gathering place of all visiting engineers and become a temple of American engineering.

"So far, I see no reason why suitable committees could not arrange the business end of such a joint occupation, in order to secure a fair, just and satisfactory system of housing the societies under a single roof, preserving to each one their present full independence wherever this is necessary and proper. Nor do I see any reason why a governing body, elected in proportion to the membership, would not properly represent the societies separately and as a whole, and properly manage those interests which are common.

"I do see a good reason, however, for drawing a distinct line between the professional societies and the social club. I understand it is the intention of having for the latter an entirely separate building, although adjoining, and this arrangement should obviate the criticism of a close union with, as you say, 'an unprofessional, social and commercial organization.'

"For one, I would be willing to trust representative committees of each society to make a careful investigation of the subject in all its bearings, and after a full discussion between such committees, and after all aspects are presented to the members of all the societies, I should also trust a ballot to decide the proper policy."

It is to be regretted that in commenting on the propositions submitted, Mr. Hering should have based his remarks largely upon sentences which he has quoted only in part, and which, therefore, convey a very different meaning from the complete sentence.

As regards education, we all agree that, in a certain sense, all conversation and intercourse between men is educational, but a society like ours cannot, in my opinion, be properly termed an "Educational Institution." That term I understand to be applied to an institution in which regular courses of study are pursued under the direction of persons skilled in particular branches of learning and possessing the faculty of imparting information to students, and examining them to find out how much they have absorbed. I do not consider the term applicable to an association of experts in co-ordinate branches of science for the purpose of exchanging their ideas and experiences. The members of such an association do not "sit at the feet of Gamaliel" and accept the law as he lays it down, but they have Gamaliel down on the floor with them and question and criticise his dicta, and probably teach him as much as he teaches them.

As for elevating the tone of other societies by simply having them under the same roof, I fail to see how this can be accomplished.

As to the proposition that the technical societies should be kept entirely separate and apart from the social and commercial element, the only reply is that the gift is for a union building, and the promoters of the scheme, in speaking of the advantages of the location, speak of its fronting on Fortieth Street and Bryant Park. That is the front door of the Engineers' Club. To get to the Engi-

neers' building you have got to go through the back door of the Engineers' Club, as proposed.

I do not know that I have any definite proposition to make on the subject, but I do think that the proper method would be, as I have indicated, for the Society to write a respectful letter to Mr. Carnegie stating that we appreciate his gift, but that the conditions attached to the gift are such that the Society cannot consistently with its professional standing accept it. (Applause.)

OBERLIN SMITH, M. Am. Soc. C. E.—Mr. President, Ladies and Gentlemen: We have heard some strong testimony from Mr. Croes and the people he did write to. I want to ask him if he can give us the opinions of a lot of the fellows he did not write to?

As I happen to be a member of all five of these organizations, I feel as if I might be able to look at the matter impartially, and as though I could see the difficulties that surround this question from various standpoints.

I do not pretend to say that we want to jump right into the arms of the present committee and Mr. Carnegie, and swallow the whole thing just as it is. It is a subject that requires consideration, but I want to answer, as briefly as I can, three or four things that have been said to-day. I think there is too much tendency in this Society—I have heard it as a rumor, and I begin to feel this afternoon as if there might be some truth in it—to think we are “It”—to use a slang expression—and that if all the members of the other societies who are engineers practicing their various vocations would only disorganize and become members of this Society, this would be the great Society, and all would be right. If that could be done I would gladly help. I do not know what the proper name would be. The name suggested by Mr. Macdonald, “The Institute of Engineers,” would be in good taste, but I do not hope to live long enough to see it. I hope somebody in another generation will see one organized in that way, with all the smaller societies forming chapters of a greater body, but we can hardly hope for that now.

The great pity is that this plan proposes to face the building on two streets and not on Fifth Avenue. We ought to have a large building, of beautiful architecture, bounded by streets on two or three sides of it at least, but we cannot get that now. The only question is the practical one, shall we take this magnificent gift for our Society, or will we consider that the entire independence which the Society now has may counterbalance that two hundred thousand or a quarter of a million which would be our share. If so, well and good; but there are other reasons why we cannot afford to let this gift go, and give it up to the other societies.

I think there is a mistaken opinion among a good many of the members of this Society who do not happen to belong to the other

societies and do not go to their meetings, about the character of the other societies. It is not true that they are places where goods are bought and sold, like some of the Railroad Associations. At the Mechanical Engineers', the Electrical Engineers' or the Mining Engineers' Societies there is nothing of that kind. I know the character of the papers which are presented and the discussions thereon, as well as the character of the members in the Mechanical Engineers, and it is as high as in the Civil Engineers. There is as much science and as much intellect as there is here. They are men of the world and they stand as high socially. In the Electrical Engineers they are men who carry on special work requiring much learning. The Mining Engineers, unfortunately, have some members who are not scientific men, but those who are do not go there for commercial purposes, and they are men of high grade, good training and high talent for engineering.

I want it thoroughly understood that if we are all going in together it is not a case of one society taking in all the little beggars to nurse them and care for them; it is not a question of "leavening the lump" as has been said. We do not want the feeling to grow that they are affiliating with this great and grand old Society. It is nothing of the kind. It is the feeling that has been with many of us for many years throughout the engineering profession in this country, and not only in the profession itself but in the eyes of the whole engineering world. We should overlook our petty jealousies and work together more, and get that harmony of action and more intimate acquaintance with each other which we need to come nearer together,—and, after all, I regard this whole matter as simply geographical. It is bad for people in a similar business to be too much separated. You cannot do the stock business of New York City in four or five stock exchanges miles apart, and so it is in all trades and businesses. Concentration is the modern thing. Bring people together where they will see each other and where they may work with each other and work together. Therefore we want the societies near together. If they were in four separate buildings connected with tunnels under the street, that might be an ideal thing. If not, then have one building and have it situated and arranged in such a way that we are not treading on each other's toes, having our own privacy, but yet being near together. It is not a merging of societies. It is merely a question of policy and expediency, and a matter of bringing us together where we may get and do more good to each other.

A man may now bring a friend from the West to New York, and he may have but a little time at his disposal. Perhaps he goes into the Engineers' Club—and by the way, I have a great respect for this Club, notwithstanding the statement that the high-balls which they have there are driving all the juniors to an early grave—but he should be able to call in at the Society Houses also, without traveling all over

Disc. 11  
Joint  
Building  
(continued).

town. I must say that I am sorry the thing has taken the shape that it has here. I know most of the men who have gotten the thing started—Mr. Scott and the others—and I think that they deserve a great deal of credit for doing what they have done. There is no secret conclave; there is to be a big committee appointed for all the societies, and all interests will be watched carefully. That Committee must be trusted to do what is right.

Mr. Carnegie knows that the club is not a technical society, but a purely social club, though containing many engineers. If he chooses to give it a present, let its building be owned by itself. The other building, anyhow, merely abuts on the Engineers' Club. Let the four societies come together as has been so often proposed, and the fact that the Engineers' Club is close to them will be a great advantage.

A man comes to New York, a stranger, and goes to a hotel; he is in a hurry, and he wants to meet engineers, and he inquires where the engineering people can be found. He is told that the Electrical Engineers are down town, the Civil Engineers are a mile up the street, and he says, "57th Street; that is too far; I haven't time to go there. Where can I meet so and so?"

It has been said that this Society will get only one-quarter or one-fifth of the property. That is not so, because we will get a share of an enormous hall, perhaps more than our exact proportion (laughter). The reason the Mechanical Engineers have to go out and hire hotels is because they cannot use their own rooms. Their hall is not big enough. Let us have a hall that is big enough for anybody and for any kind of an engineering meeting. It can be let out to the Association for the Advancement of Science and other big societies here and from abroad. It will be a place where all Science can have its headquarters. Let us have it big enough. There may not be another chance.

This Society should not take too much credit because it happened to be born first, but it had better look out not to get in the back seats by too much delay.

Now, about other societies coming in and backing out afterward, not paying the interest on their share of the loaned money, there could be arrangements made, I think, to force them to give up their holding. If they are bankrupts they cannot stay there, and we do not want them. Why can't they go out and leave the property to the rest of us?

I think that we ought to look at this whole thing from a larger standpoint than any of us have done yet. What would be the effect on the engineers of this country, and upon engineers in Europe and all over the world, if this Society holds itself so close that it cannot come in with the other societies? Those societies are great, growing



and enterprising, and so recognized all over the world. They come together and accept this magnificent gift and run the thing, and it increases and becomes famous, as it will, and this American Society of Civil Engineers cannot afford to be left out.

I therefore am in favor of this resolution except that I wish to offer an amendment to it. I do not remember the exact wording. Mr. Hunt will doubtless supply me with the clause, the portion where it says that the Board of Direction shall be instructed to examine into the feasibility, etc., and then issue a letter-ballot. What is the exact wording?

THE SECRETARY.—Perhaps I had better read it over.

(Resolutions read. See p. 226.)

MR. SMITH.—To that last resolution but one, where it says “Resolved, that they send a letter-ballot,” I offer, in amendment, to insert the words “within sixty days.” If that is not proper we can make it more, but what we have to fear in this matter is that the thing will be delayed—hung up, so to speak—and go on for months and months. The other societies have acted promptly, in good spirit. Mr. Carnegie is a man of business, and wants to do business, and do it quickly. We don’t want to linger. We should send out this letter-ballot and find out what the Society wants. The members of this Society must rule, and we can thus find out, and soon.

THE SECRETARY.—The Board offers the resolution to the Society for adoption.

MR. SMITH.—I offer that amendment.

THE PRESIDENT.—The question before the house is on the adoption of the resolution reported by the Board.

H. S. HAINES, M. Am. Soc. C. E.—If I may be pardoned for inserting one word to facilitate this thing, I suggest that this gentleman’s amendment be received and laid upon the table and taken up at an advanced stage of this discussion. We have gotten along in the afternoon and we have endeavored to concentrate our attention on the remarks of the gentlemen who have prepared themselves fully to give us information *pro* and *con*, and I, for my part, do not feel that I am physically able to act intelligently if this thing is brought to a vote now, and if we begin to take up one amendment after another and discuss it for what it may be worth, good or bad, it will be a long time before we get to the subject which is germane to the whole discussion, and that is the resolution which the Board of Direction has offered to us for our action. At last, that is the thing we are going to get to, and that is the thing we are going to discuss. When that time comes I hope to have the opportunity to express some views on the subject myself, and when I do, I want to ask that they may have as careful consideration as you have given to the remarks of the gentlemen you have already heard; therefore, I hope that the gentleman will



not understand that I am endeavoring to prejudice his argument, but I ask that it be received and laid on the table to be brought up at a later part of the discussion.

MR. SMITH.—If this discussion is to go on through the Convention I should gladly have it delayed, but I don't want to have it laid over until some other convention. If we may continue the discussion to-morrow or at some other time, that will be satisfactory.

MR. HAINES.—I hope the gentleman does not think that I want to interrupt him, but if that amendment can be laid on the table to be brought up at a later stage of the discussion, he can go on to the other branches of the argument without prejudice to it.

THE PRESIDENT.—Mr. Smith has the floor. Does Mr. Smith yield to a motion to lay the subject on the table?

MR. SMITH.—The whole subject?

MR. CROES.—The motion is, I believe, that it be laid on the table. I don't think that is at all necessary. I think this is the most important subject that will come before us, and we had better simply adjourn this meeting until, say, half-past nine or ten o'clock to-morrow morning.

MR. HAINES.—I do not propose to lay the resolution of the Board on the table. I propose that the gentleman's amendment to those resolutions should just be laid on the table temporarily, to be brought up at an advanced stage of the discussion, that is all.

MR. CROES.—That will be better accomplished—a motion to adjourn is always in order—and it will be most effectually accomplished by adjourning now to some named hour to-morrow.

THE PRESIDENT.—The Chair is under the impression that the amendment of Mr. Smith is not seconded, and the question is upon the resolutions offered by the Board.

MR. SEAMAN.—I would move, Mr. Chairman, that we adjourn until to-morrow morning at 10 o'clock.

MR. SMITH.—I second the motion.

THE SECRETARY.—Will you allow the Secretary to say one word? It will be a physical impossibility to hold two meetings at the same time, I think; and the programme, which has been very carefully laid out by the Committee in charge of this Convention, provides very fully for all of the time during the Convention, except the meeting for Friday morning which is the last day of the Convention.

MR. SMITH.—I believe the question is on the motion to adjourn.

MR. CATT.—May I say just one word? I move to amend the motion to adjourn to to-morrow at nine o'clock, at which time this question may be taken up and discussed for one hour. The motion to adjourn to a fixed time is capable of amendment.

The motion was seconded.

MR. SEAMAN.—I do not think any business that will come before this Convention compares with this in importance, and I think that if

to-morrow morning's business is postponed until Friday morning, it will be just as well as to have it to-morrow morning, and if to-morrow we do not have time to discuss it fully, eliminate it altogether, and we should adjourn until ten o'clock to-morrow, and then, if necessary, continue it. I would move that we adjourn until ten o'clock to-morrow morning.

THE PRESIDENT.—The Chair will entertain a motion to adjourn; the motion is not debatable or amendable.

MR. SEAMAN.—I don't know who made the original motion to adjourn.

MR. CATT.—I simply want to call your attention to the fact that a motion to adjourn to a fixed time is a debatable motion.

THE PRESIDENT.—The motion before the meeting, the Chair believes, is a motion to adjourn without fixed time, and it was seconded. Such a motion has to be put to vote without debate. The Chair will put the motion.

MR. SEAMAN.—I do not see why we should restrict ourselves. The only objection to this whole procedure is trying to limit the discussion on this subject. There is nothing that can come before this Society at this time that compares in importance with a full and free discussion of this subject. If we adjourn until to-morrow at 10 o'clock, we can then adjourn at 11 o'clock if we are through with the work.

THE PRESIDENT.—It is quite within the power of the meeting to vote down the motion to adjourn.

MR. CATT.—I would like to change my motion to amend, if Mr. Seaman will permit, to call the meeting earlier to-morrow morning and leave open the question of how long we will discuss this question. Make it 9 o'clock instead of 10. I would like to see him do that.

THE PRESIDENT.—Does Mr. Seaman accept the motion to adjourn until to-morrow at 9 o'clock?

MR. SEAMAN.—Yes.

THE PRESIDENT.—Those in favor of adjourning until 9 o'clock to-morrow for the resumption of the discussion of the matter will please say aye.

The motion was carried.

(At 5.50 P. M., adjourned to Wednesday, June 10th, 1903, at 9 A. M.)

## BUSINESS MEETING—(Continued).

Wednesday, June 10th, 1903.

The meeting was called to order at 9.45 A. M. President Alfred Noble in the chair; Chas. Warren Hunt, Secretary. Meeting called to order.

THE PRESIDENT.—This meeting is held pursuant to adjournment yesterday to continue the discussion of the proposition for a union

engineering building. Mr. Oberlin Smith had the floor when the meeting adjourned.

MR. SMITH. Mr. President, I will withdraw the amendment that I offered to the Board's resolutions in regard to a time limit. On further thought, there is little question but what, if the Board has the matter in charge, they will do right. I believe they appreciate the importance of the matter. Whatever may be the opinions *pro* and *con*, there are arguments on both sides about this Society affiliating with the others that can be decided only by the membership at large. It cannot be decided by this small Convention in any fair way, and those resolutions that we are voting on are simply to put it before the Society so they can vote on it. It does not commit us as a Convention or any of us as individuals to voting for either policy. It simply looks at the great scheme, which has come up, with impartiality, and arranges to put it before the membership at large, where it ought to go. I do think, and would urge on everybody concerned, that we ought to make haste. The thing has gone some time now since Mr. Carnegie made his offer, and due diligence should be exercised by all the societies in coming to some harmonious action on the subject.

I believe the Committee of Fifteen, as far as the Club and the other three societies go, has members appointed by authority of the Boards of those societies, but the three members who acted from this Society, as I understand it, were doing so only informally. I suppose our Board will attend to that matter, and when they do take it up, will appoint a committee, perhaps of three, which will confer with the other societies. I, for one, sincerely hope that, although the Engineers' Club is a good thing to affiliate with, socially, professionally and geographically, yet we should not be five partners in the legal sense of ownership of the property. The four societies can work together, and although one is older and a little bigger than the others, yet the young ones are growing, and I want to insist again on the professional status of those other societies as being remarkably respectable. (Applause.)

MR. HAINES.—Mr. President and Gentlemen: I listened with a good deal of attention to the remarks that were made here yesterday, and in order to keep my own remarks from being too diffuse, I have taken the liberty to reduce them to writing. I do not wish you to suppose it is a speech.

I came here with no more information on this subject than could be gained from the daily papers. I have listened attentively to all that has been said, and in my remarks I shall speak from a standpoint which I hope and believe is occupied by most of the members here present—that is, the attitude of an inquiring mind.

At first sight, one is attracted by the proposition made by Mr. Car-

negie, so unexpectedly, with such munificence that the judgment becomes confused and dazzled with the view of apparently unexampled possibilities in the way of co-operation for the advancement of the engineering profession. It is well, therefore, that we should have heard the views of those who have carefully prepared themselves to present this proposition to us, stripped of what has been termed its glamour. After hearing these arguments, we must wonder what is left to be said in its favor.

About one thing I feel greatly relieved. I was glad to hear that the other societies to whom this proposition has been made have already determined to accept Mr. Carnegie's offer, regardless of what action this Society may take. I say that I am glad of this, for we now feel that we are free from any responsibility to them, and that we may consider the proposition solely as affecting the welfare of this Society, without any scruples of conscience as to how our actions may affect their welfare.

Before I make any suggestions in this line, however, there is a word that I would like to say with reference to the sarcastic remarks made at the expense of the Engineer's Club, which added so much to the gaiety of yesterday's session. I listened to these remarks with pain, for I have been a member of the Engineers' Club for nearly twenty years. I see in this assemblage faces which are familiar to me as its members, and the faces of others whom I have seen there enjoying its hospitality. The Engineers' Club has a membership of a thousand members and a large waiting list. It is a prosperous club. I have never heard of its asking alms. Some of its members formed a real estate corporation, and with their own money purchased the building site on Fortieth Street that has been facetiously mentioned here as the back door of the future building of the Engineering Society. I have been on its Board of Governors for five years. I am therefore familiar with the scrutiny to which all applications for membership are subjected. I have had a somewhat similar experience in the management of this Society, and I am therefore prepared to say that the social standard of membership in the Engineers' Club is fully as high as in this Society. I do not understand that the Engineers' Club sought Mr. Carnegie's money, and I imagine that the majority of its members know little about the merits of the proposed affiliation of the engineering societies, and care less.

It seems, however, that certain gentlemen officially connected with that club, in the ardor of their zeal for its welfare, were imprudently led to associate themselves with this objectionable proposition. Their names have been mentioned in this meeting by those who know nothing more of them than that one of them has occupied an official position in this Society. I may say that I have known them long and well, that I am proud of possessing their friendship, and I feel sure that



Discussion of  
Fourth  
Engineering  
Building  
(continued).

there will be no lack in this meeting of a confirmation of what I have stated.

If I have been led to speak at some length in the defense of the Engineers' Club it is because of the remarks concerning it which I think have been unnecessarily interjected into the discussion, and if what has been said to its disadvantage is to go on record in this meeting, I shall expect that what I have said in its defense shall likewise go there.

Now, I shall confine my remarks to what I consider to be specifically the matter before us, and that is the consideration of the resolutions that the Board of Direction has prepared for discussion at this meeting.

Gentlemen, I ask you to think for a moment as to the origin of these resolutions. They have been prepared by your Board, which is composed of members elected—and elected by a Society vote—from every district represented in this body; men who have the welfare of this Society at heart, and who have carefully weighed the effect of the action which they have recommended you to take. Therefore, these resolutions are entitled to your respectful consideration, and, to my mind, the burden of proof is not so much upon those who speak in their defense as upon those who speak against them. The action suggested by the Board is the result of their investigations made with ample opportunity for arriving at a just conception of the nature of Mr. Carnegie's proposition. Have they flouted it? Have they indulged in jibes and jokes at the expense of the other societies whose names have been associated with the American Society of Civil Engineers? Far from it. They have approached the subject with a seriousness worthy of its importance. And what have they recommended? Why, that you should properly authorize the Board to make such investigation as will enable the proposition to be submitted to the members for a letter-ballot, intelligently.

What more is proposed? What else can this Society do without exposing itself to the charge of a lack of decency. Who is there that is authorized to reject such a proposition on behalf of this Society except its members, and who is there that will assume to take such a responsibility to himself?

In all that I have said I have not said one word in favor of accepting this proposition. Indeed, I appreciate the force of the argument so carefully prepared, so conclusively presented by our honored Past-President, to whom this Society has been greatly indebted throughout its existence—an argument powerfully reinforced by the opinions of those other eight of our honored members, his peers in the past history of the Society.

I recognize the proud position which our Society has attained. I love the comfort and quiet of our beautiful Society House, our own



property, paid for by the contributions of our own members. Not the one-fifth of Mr. Carnegie's gift, not the whole million dollars, if presented entirely to our Society, could add one iota to my enjoyment of the privileges which I so highly value as a member of this Society.

No, Mr. President, it is not for such gentlemen as have been named in support of Mr. Croes' argument; it is not for those who, like myself, have benefited by our past association with the Society, that this proposition offers any advantages. For me, I should far prefer to enjoy what we have in dignified independence.

I listened with interest to the remarks made at the opening of yesterday's session by our Past-President, Mr. Wallace, and to his words of wisdom, after presenting the germs of all that bears on this discussion. My sympathies were entirely in accord with the sentiments which he so forcibly expressed, but he said one thing which has stuck in my mind and which has made a different impression from what he intended. He said that if we should take the step of affiliation with the other Societies, that instead of our Society holding its present proud pre-eminence as the representative of every branch of engineering, we should be placed in the position of representing only a remnant. That is a serious thought—that the American Society of Civil Engineers should ever be put in the position of a remnant. Why, if this is to be the logical conclusion to be drawn from the proposition submitted to us, there can be but one answer to it. Better go back to our former humble abode on Twenty-third Street than to occupy a gilded palace with such a lamentable result. But is there another application of Mr. Wallace's thought? Is it possible that by a process of exclusion we may drive from our membership the mechanical, electrical and mining engineers, and by a further process be deprived of the sanitary engineers, for instance, and the engineers who are contracting for all the municipal and structural works, commercial engineers, if you please? What sort of a residuum would be left to us then? Is the tendency of modern engineering activity to strip our noble tree of one branch after another until nothing is left it but a lifeless trunk?

It is not for the older members of the Society to decide this question; they have no interest in it. This Society will last their time in all its strength and prosperity. It is for the younger members to ponder over. It is a problem which affects their future. I hope that they may solve it as wisely as their predecessors have solved those which have come before them.

At all events, I appeal to every member present to vote for the resolutions presented by the Board. I had proposed to say, without amendment; but it has occurred to me that perhaps their resolution is open to this objection, that the vote upon them by the letter-ballot is intended to be called for—when?

DISCUSSION OF  
THE  
BUILDING  
COMMISSION.

THE SECRETARY.—Within a reasonable time.

MR. HAINES.—It seems to me that it would be better to provide that this very important matter should take the same course that all other matters of importance have taken in this Society, as, for instance, for the appointment of special committees from time to time, and it seems to me that, with that exception, gentlemen, we should vote for these resolutions, because it places upon the Directors the responsibility which they have requested and which belongs to them by right of their office (applause), carefully to consider and report upon the proposition in connection with the letter-ballot, and leaves the decision where it should finally rest, not with the few members here present, but with the membership throughout the length and breadth of this land. (Applause.)

FREDERICK BROOKS, M. Am. Soc. C. E.—Mr. President, a letter from Professor Swain was read yesterday, making some statements with regard to action taken in Boston; and it was introduced with an expression of doubt as to whether any of the gentlemen concerned in the Boston meeting are here.

I am sorry that there is but a small representation from Boston here; but I was myself present at the beginning of the meeting that was held there a week ago on Monday (although I was obliged to leave before it was over); and I talked upon the subject with my friends there. As the discussion yesterday attached weight to the expressions of opinion already offered by our members, it is proper to state that in Boston there was at least some knowledge of both sides of the question. One gentleman who was quoted here as one of the eight surviving early members of the Society happened to be in Boston about ten days ago; and I had the pleasure of an extended conversation with him in which he mentioned several of the points which he has included in his letter; and the paragraph from Mr. Morison's address, as President in 1895, occurring in Mr. Corthell's letter which was read yesterday by the Secretary, was read at the meeting in Boston. Some of the votes in the Boston canvass were sent by mail by persons not present at the meeting, but there was an attendance of thirty at the meeting.

Let me say a word for myself before I sit down. I share the views so ably presented by the last speaker here. It seems to me that a great deal that was said yesterday was not germane to the real question. It does not seem to me essential to enquire just what is the quality of the different societies involved in this proposition; it is not a question of amalgamation with them or union with them. It is a question of quarters in New York; and I am profoundly impressed with the great desirability of our having friendly relations with the other engineering organizations which have been referred to. It is very desirable that this Society shall have their friendship and sympathy; also

that this Society shall have, as far as possible, its influence upon them and have them feel a regard for its ideals. I strongly hope that the resolutions which have been prepared by the Board of Direction will be passed; and I have firm faith that such gentlemen as will naturally be put in charge of business of this character will be able to overcome any moderate difficulties in the way of what I regard as a most desirable consummation. (Applause.)

MR. CATT.—Mr. President, I only wish to take your time for a moment. It seems to me that some of the matter that has been presented to us to-day and yesterday afternoon was probably of the nature of setting up a straw man and then proceeding to knock it down.

Now, I have before me what purports to be the offer of Mr. Carnegie, and I find that in that offer the American Society of Civil Engineers is first mentioned, and that the Engineers' Club was last mentioned, and I do not believe that Mr. Carnegie intended us as an anti-climax. I believe he intended to place the American Society of Civil Engineers as the first among the bodies to which this gift was to be given.

Allow me to say, it is not necessary, of course, that I should say that I have the honor of being a member of the American Society of Civil Engineers, but I have the pleasure of being also a member of the Engineers' Club, and I think that both organizations are eminently able to take care of themselves, and, in their particular lines, are perfectly respectable and creditable. As to whether they should be united in a common building and a common association, as outlined by the gift, would be a serious question. It seems to me that we should approach this question in a somewhat different spirit than has been manifested by some of those who have taken part. The spirit and intent of this gift, as I understand it, is to promote the interest of the engineering profession throughout the country, not only of this Society, but of all other societies, and the profession in general. This Society is unquestionably the ranking Society in this country at the present time. That position, I think will be conceded by the other associations that are asked to join in this movement. I think that the other associations are willing to grant to this Society that position, and I think that our strong position that we hold here would make us, not the people that should be the draggers in this movement, but that we should be the active and earnest people to further the advancement of this project and find some satisfactory solution of the matter.

There are several things that, it seems to me, have been brought in here that really have no connection with this matter. For instance, the Engineers' Club is not the dominant factor here. I think the American Society of Civil Engineers, in the end, will have just as much to say, as to what is to be done with this gift, as any other association. I believe that they will be the dominant force in this

movement, if they take hold of it in a right manner, and if it is ill-adjusted, have the Engineers' Club in the same building under an undivided interest, that matter can be arranged for and carefully taken care of. It does not seem to me that it is absolutely essential that the property, even on Thirty-ninth Street, should be made a part of this project. I do not see any mention in the proposed donation that the property on Thirty-ninth Street shall be a part of the project. It may be better, and on investigation prove to be very much better, to have the united building alongside of the present building of the American Society of Civil Engineers. That matter has yet to be determined.

I do not think we should, in any case, take the position that we are either to rule this thing or do nothing, that it must be all our way or not at all; or that we will be like the little girl in the neighbor's yard, that if we cannot have it all our own way, we will take our rag dolls and go home. That is not the spirit in which we should approach this question.

In the matter of the other societies, I think in their several lines, they are as capable and as representative a body of men as we are. They do not cover as broad a field, to be sure, and I think most of them recognize that that is the fact. At the same time, if I were a member of those societies, which I am not, as I am a member of this, and this Society refrained from entering into an earnest endeavor to reach a solution of this problem which would allow us to unite, I would organize a society independent of this society which I would call The Institute of Engineers, and I would invite 250 members of each of the societies of the best, to come to it, and I would make the restrictions higher than those of the American Society of Civil Engineers, and twenty-five years from now it would be the ranking society of this country.

Take as an illustration: I happen to have pretty intimate relations with a good many of the members of these other societies, and I assure you that while they are young, there is not a brighter body of men anywhere than those that compose the Institute of Electrical Engineers. Twenty-five years from now they will be one of the strongest societies in this country, whether we join with them or not. It is as certain as that the time will roll by.

I am very much in favor of leaving this matter with the Board of Direction. I think that this resolution should be adopted, and that they should be given whatever time is necessary to bring the matter to a satisfactory solution. If it is found advisable to separate the common interests from the Engineers' Club, that should be done. Personally, I am in favor of it. I should think the club should have its independent existence entirely apart from the societies.

If it is found advisable that the property selected on Thirty-



ninth Street is not entirely satisfactory. I do not see why the Board of Direction cannot remedy this matter. We are not absolutely committed to it, nor is any one else, so far as I know, except possibly the people who were instrumental in securing the option.

For my part I would be in favor of saying to the donor, we thank you, and we will give to this matter such care and consideration that will find a satisfactory solution. I would say to the other societies, we will join you in this matter to the best of our ability to work out a solution of this matter that shall be to the best advantage of the engineering profession. And I would say to the Engineers' Club, we want to join with you in this matter to the best interests of us all, and then I would go forward, sure that this Society could not be injured by any friendly affiliation with the associated societies. (Applause.)

R. W. LESLEY, Assoc. Am. Soc. C. E.—Mr. Chairman, the matter of the resolution seems to me to require possibly one small addition. The Committee of the Board, as I understand it, is limited in its decision as to the question of suitable apartments, or suitable quarters. It seems to me that some amplification of that might be added so that it might cover such facilities, both as to terms and as to regulation. In other words, the question is not merely whether the house suits us. It might suit us very well, but can we pay the rent? That is quite another question. And next, there might be regulations restricting us in our action, which is quite another serious problem. Therefore, it seems to me that some amendment of that might be proposed, simply broadening out that particular clause which would give our committee or our Board of Direction a little further power than is given under the wording of the resolution itself.

As to the question of time, it would seem that in all of our proceedings, in the appointment of every important committee and every important report, there has always been accorded a certain time for consideration and a certain term of notice. It would seem to me that this matter is either one that is good enough to keep or that it will not keep. If it will keep we want it; if it will not keep we don't want it, and therefore it does not seem to me that anything would be injured by giving it the proper consideration that those proceedings have in the general body of this Society.

One more point and I am done. This whole question seems to me to remind one very much of what we read of the debates in the constitutional convention of the United States. A number of States, a number of engineering societies; a number of States with their governments, their treasuries, their legislatures and all of their organization, and that is the case with these societies. It is now proposed to make a United States of Engineering; that can be done as it was with the United States of America. There is a President and



Discussion on  
Joint  
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continued.

there are rules and regulations governing all, but the rights of each State are preserved, and each State is independent. Each State is self-contained. Louisiana has the law of France, we have the law of England, but each State has its rights, its powers and its regulations, and yet they are all subservient to the general regulations of a general body. It would therefore seem to me that by widening the power of our Committee some regulations might be introduced in the body that is to govern or in the organization that is to control this building, making it not an affiliation of engineers, but a building for engineers—a United States of Engineering—and under that provision it would be perfectly possible to have a regulation in the voting for the board members like we have for Congressmen; it would be perfectly possible to have a regulation by trustees elected by property rights as we have Senators; and with that thought and with that idea that could be carried out in this case. We might all arrive at a conclusion by which the rights of all of the societies, and all their powers and all their privileges could be maintained, and still have what is proposed here, and be well regulated and well governed, and with all the interests subserved. (Applause.)

MR. HARROD.—Mr. President, if the gentleman who has just spoken will put his first suggestion in the shape of a resolution I will be very glad to second it. It occurred to me, soon after the reading of those resolutions, that it would be well to entrust the Board of Direction with larger scope, larger authority than seems to be written in them, to give them the opportunity, not only of determining the matter as to the question of accommodation—and the resolution seems to be confined to that—but to give them the authority not only to consider that, but to enter into conference and make their suggestions so as to open the subject wide in order to see if there is any line which is just to this Society and that will lead to final success. Then let their report cover not only the question of accommodation, with arguments *pro* and *con*, but let it cover the whole question.

MR. LESLEY.—If Mr. Harrod will prepare that resolution—he has given the subject more thought than I have—I would like to have you prepare that resolution if you will do it?

MR. HARROD.—Well, I should like to see the scope of the duties entrusted to the Board of Direction enlarged.

THE PRESIDENT.—Major Harrod, will you and Mr. Lesley prepare that amendment?

MR. LESLEY.—Yes, sir.

MR. CHARLES HANSEL.—Here I have it all prepared. (Laughter.)

MR. HARROD.—I don't think this exactly meets the point that I have in mind.

MR. HANSEL.—Well, then, I will offer this afterward.

MR. SEAMAN.—Mr. President, I have been very forcibly and very

favorably impressed, as I think has every one present, with the words of Col. Haines, and with the words of Mr. Catt, and I would like to say that I have, from the beginning, been heartily in favor of a closer association of the national engineering societies if it is practicable or if it can be made practicable, but I think it is important to demonstrate its practicability in every important detail before we jeopardize the ownership of approximately a quarter of a million of dollars and a home which we have established after long years of patience. It is with that anxiety, with a jealous guarding of that home that some of us have been very seriously worried for fear the control of our own property and of our own affairs would pass to the hands of others, and that fear is born of the experience of the past few weeks.

Mr. Carnegie has sent us a most generous offer, and the offer has never reached the Society in the shape in which it was sent. The letter containing the offer and everything it contained has been, it seems to me, coralled by the Engineers' Realty Company, and if I may so express it, it has been tied up in a little plot on Thirty-ninth Street where it looks to me as though they would erect a building for the four National Engineering Societies, and have an entrance to that building over private property owned by the Engineers' Realty Company and used by a social club. That is a pretty strong statement, gentlemen, but it is only reached after looking at the matter very fairly.

Why was the property on Thirty-ninth Street selected, and by whom was it selected? It was selected by the members of the Engineers' Realty Company after they had purchased their property on Fortieth Street. It was selected right back of their property on Fortieth Street. It is proposed to put this magnificent building on a back street, when we, worth approximately a quarter of a million dollars, can afford a better site. The entrance to that building is to be through property owned by the Engineers' Realty Company, and to that extent under their control.

With our present financial standing, with the present financial standing of the American Society of Mechanical Engineers, with the prospective standing of the Institute of Electrical Engineers, why should not the building be located on a more favorable site, such as Fortieth Street? Has the Engineers' Realty Company offered to contribute its site, already bought on Fortieth Street, to the general project? I have not heard of any such proposition. In fact, it is only a week ago that a member of the Engineers' Realty Company said to me, "Mr. Seaman, you will take it as it is, or you won't take it at all." I replied, "Mr. ———, I am ready to vote on that to-morrow."

Those of us who chanced to attend the meeting of May 7th in our own Society house felt that the Engineers' Club did have the control. When Mr. Catt says we control our own affairs, he forgets that we are

only three in fifteen, and that the Electrical Engineers and that the Mechanical Engineers are, by their very nature, more commercial in their organization than we possibly can be.

It seemed to me that the presentation at that meeting came almost entirely from the Engineers' Club and its affiliations, and when Mr. North arose to ask a few pertinent questions I was dumbfounded when a member then moved that the meeting adjourn. It was after that that Mr. Oberlin Smith arose and said that we should hear from the Civil Engineers, since we had not heard from them, but after a very little more discussion, some resolutions, which had been prepared in advance, were offered, and here is the tenor of them:

"At a meeting held on the evening of May 7th, 1903, in the house of the American Society of Civil Engineers, attended by official representatives of the American Society of Civil Engineers, the American Society of Mechanical Engineers, the American Institute of Mining Engineers, the American Institute of Electrical Engineers and the Engineers' Club of New York City, it was

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"*Resolved*, that we hereby tender to Mr. Andrew Carnegie our hearty thanks for the trust he has imposed upon us, which we accept with a full realization of its responsibilities, and will endeavor to carry out with all possible dispatch and effectiveness, thereby to hasten the day when engineers shall"—

I haven't the last of it, but, at any rate, that is the acceptance of that proposition in the house of the American Society of Civil Engineers, with the Civil Engineers speaking hardly a word.

Why, gentlemen, it was only for one purpose. Some of us were very much concerned, and quoting from a letter, which I wrote at the request of *Engineering News*:

"It was only then that the members of the American Society of Civil Engineers, who happened to be informally present, awakened to the responsibility they were asked to assume, and it was through their outspoken objection that the message and resolutions were finally modified.

"The experience thus gained does not demonstrate the advisability of placing the management of any of the Society's affairs in committees composed of outside interests."

MR. HAINES.—Excuse me, but my only object in rising is the hope that we may expedite the determination of this question, and as there has been some discussion about the manner or the time in which the proposed report of the directors shall be submitted for letter-ballot, I would offer this resolution:

"It is the sense of this meeting that the letter-ballot called for in the resolutions should be presented to the Society with the usual sixty days' notice and opportunity for discussion in business meeting."

MR. HANSEL.—I second that motion.

THE PRESIDENT.—There is a motion before the meeting. Is there any discussion?

MR. CROES.—The question of the usual sixty days' notice to which Colonel Haines refers is, I suppose, the regulation according to the Constitution that matters which are to come up at the Annual Meeting shall be presented with sixty days' notice and discussed at the Annual Meeting and then presented for ballot. I do not know of any other provision for the usual sixty days' notice for the taking of a letter-ballot and the discussion by the Society before the letter-ballot is presented, but only after a general business meeting, of which there are two, the Annual Convention and the Annual Meeting. Does Col. Haines mean to refer to the constitutional provision regarding the annual meetings in that case at which discussion takes place?

MR. HAINES.—Mr. President, I admit that I left it open intentionally. I desired to get the sense of this meeting as to whether they would prefer to postpone this whole matter, to delay it until it should come up at the Annual Meeting, or whether it might come up for discussion at our usual monthly meetings. In the latter case it would somewhat expedite the consideration of the report and it being spread broadcast through the country to our membership. If it is to be deferred to an Annual Business Meeting, why that delays action upon it, and I purposely left that open. I thought there was an opportunity here to discuss that particular point if the resolution should meet with favor in this body.

MR. SMITH.—Mr. President, it is very much to be deprecated that this whole matter should be left open until the Annual Meeting, and then have another delay in getting ready the ballots and sending out the notices, and then sixty days after for balloting. That puts the whole thing off nearly a year. It seems to me that with the feeling of the other societies, it could not possibly be delayed that long, and we would be simply left out. Perhaps that is what some of us want; some do want to be left out and some do not; that is the very point that the membership ought to decide, whether this Society is going to be left out from this affiliation with what is going to be a great engineering center in New York, with other societies all around, and clubs, and architects' offices, a general headquarters of engineering for the United States and Canada. Any idea of putting it off for about a year before saying whether we will or will not accept that gift probably means our being left out. If this convention wants to take such responsibility and give the membership at large no opportunity to decide the question, so be it, but our Board of Direction should be able to take action, and within the next two or three months settle on something so that the letter-ballot can go out soon. I do not, therefore, favor this sixty days' waiting after the Board of Direction shall satisfy themselves.

MR. DAVISON.—Mr. President, I hope that the resolution offered by Col. Haines will be adopted, whether it takes a year or two years or five



Discussion of the years. I consider that this matter, as expressed yesterday, is one of the most important questions that has ever come before this Society, and I think that we have all gained a great deal of good by being here these two days to listen to the arguments that have been already presented. I feel that all the arguments will not be presented at this meeting, and I think that those who are absent and cannot be reached even by the voice of this meeting should be given all the information that it is possible to give them before they are asked to cast their votes.

As to what this delay may mean to this Society or to the other societies, or to Mr. Carnegie, it is about like this: I understand that the other societies are going ahead with this project, or at any rate, we can come in or stay out as we see fit. I think they will prefer to have us come in, even if we should delay coming in for a year or two, so that it does not affect them seriously. They will have their home whether we come in or not.

As to the effect upon Mr. Carnegie, I would say that I happen to live in a section of the country where Mr. Carnegie's gifts have been very numerous, and the history of those gifts is that they have not always been accepted with the enthusiasm that they seemed to deserve. Years have elapsed before final acceptance in at least two cases that I know of, and there is a gift at present hanging over the heads of the people of that community, and it has been so hanging for a number of years (laughter). Mr. Carnegie is a persistent giver (laughter), and when he makes an offer, he does not expect an answer at once, but desires to have it weighed carefully.

So that I am satisfied that we are not losing our share in this gift by waiting even a year, if we so desire; it will certainly not hurt Mr. Carnegie's feelings if he knows we are carefully considering the matter, and I believe in so considering it. While I do not agree with all the remarks that have been made by the other members, I think it is perfectly proper that we should have all the points, whether or not they are agreeable to us or to others; let us have them all; it may influence us in the right way.

I feel that a great deal has been said that might have been left unsaid, and yet those remarks have certainly educated me. Doubtless some of the members of the Society who are not here to-day may desire to speak upon this subject, and I think they should be given an opportunity, and I believe the first opportunity that can be given them now is at the Annual Meeting next winter, and I think the resolutions should provide, and I believe it is the intention to provide, that there shall be at least one more general discussion of this subject. I think it is absolutely necessary that we should have it. (Applause.)

Mr. Brooks.—Mr. President, if I understand correctly, the resolution of Mr. Haines is before the house; and if so, it is fair to ask what the significance of it is. The opinion has been expressed that the



"business meeting" referred to in his resolution means such meetings as are held annually, the Annual Meeting and Annual Convention, of which there are only two in a year. There is another interpretation possible, Mr. Haines says, to wit, that it refers to monthly meetings of the Society. I would like to be informed as to that.

MR. CROES. — Will Colonel Haines accept an amendment to that, which is that this resolution be presented for discussion at a time not less than sixty days before the next Annual Meeting? That would give time for discussion. I doubt very much whether, during the summer season, the committee which has charge of this matter could obtain all the information that it wants and formulate its ideas, and we do not want to delay it. Nobody wants to delay it to an unreasonable time. I wish to see the matter come before the Society fully and be fully discussed, and to vote with the majority, although I may vote against it at the time. Still the decision of the majority will govern me, but if some little time is given, a little time within which to present this question, say, so that the usual notice before the Annual Meeting can be given, and not later than that.

OSCAR LOWINSON, Assoc. M. Am. Soc. C. E. — Why not entrust that to the Board?

MR. CROES. — Well, the Board might lay it over. If you want to make the Board act promptly, give them a limit of time and make that limit of time the sixty days before the Annual Meeting.

MR. HAINES. — Mr. President, as you see, it was evidently my purpose in offering this resolution to take advantage of what has so far been developed in this discussion, and I think you will agree with me in the opinion that it has developed the fact that we know very little about the matter, and that a matter of this grave importance should not be acted upon hastily and with insufficient information.

Now, I think, from the discussion on my resolution, it is plain that the gentlemen here present are of the opinion that there should be further time given for a consideration of this matter before any letter-ballots should be taken. I offer that resolution, not with any purpose to defeat the wishes of the majority of the membership of this Society, but with the purpose of obtaining that opinion and to have it carefully and intelligently rendered. For that purpose, I thought we should have at least sixty days after the report of the Board had been presented, in order to think this matter over before any vote was taken on it.

I will say that I purposely refrained from saying whether the sixty days' notice should be anterior to a monthly business meeting or to the Annual Business Meeting, and it is now quite open to any gentleman here present to offer an amendment that the business meeting shall be the Annual Business Meeting. Now, if that amendment is offered and a vote taken on it, and it is decided that it shall be at the Annual

Business Meeting,  
then that amendment would be incorporated in my  
resolution, and my resolution can go before you with that amendment.  
If that amendment is voted down then it will evidently be the sense  
of this meeting that the delay shall only be until a monthly business  
meeting. I hope the gentlemen that desire to see this matter referred  
to the Annual Business Meeting will offer an amendment to that  
effect.

MR. SMITH.—Mr. President, I hope that Col. Haines' motion will stand, although sixty days is rather long to wait for the letter-ballot, as it is better than to put it off until the Annual Meeting. If the amendment is voted on to put it off until that time and then have sixty or ninety days' delay after that——

MR. CROES.—The Constitution requires sixty days.

MR. SMITH.—But I hope that will date from one of the monthly meetings, as Mr. Haines intended it.

MR. HAINES.—I did not say that.

MR. SMITH.—Well, he evidently left it open, so that it might be from any meeting, a monthly or an Annual Meeting. That leaves it in the hands of the Board of Direction, and that is what I had in mind. They would know much more than we do about it. They live in New York, and are able men, coming in close touch with the other Societies. Leave it to them to hurry up the thing and get it in proper shape. What is the use of this small convention now attempting to put the matter off until the Annual Meeting? Leave the thing as Mr. Haines has put it, and that will give the chance to have the Board of Direction act quickly on the matter, and, if they can present it at a monthly meeting, do so.

There is one point I have to urge against what Mr. Davison has said, that it would be just as well to accept Mr. Carnegie's gift or our share of it a year or two hence or at some other time as well as now. There is one important point that he did not take into consideration. If the other societies, to whom Mr. Carnegie is going to give the thing if we do not go into it, should decide to go ahead and make their building plans, and actually start their building, or, at any rate, get an architect and have the thing worked out before we do anything, then, if we want to come in, we have got to take those plans as they have planned them, and we have got to take a part of a building that we did not plan ourselves. We want a finger in this pie, and we want a big finger in it. If a big building is to be put up, which is partly for us, we want to have a big share in the planning of that building, but if we delay and then finally come in, we have got to take part of a building, in the design of which we have had no share.

MR. CROES.—I want to make one remark in reply to Mr. Smith. He spoke of the Board of Direction living in the City of New York. They do not live in the City of New York; they live all over the coun-

try from Maine to California, and from Canada to New Orleans, and there are thirty of them, and seven of them constitute a quorum. Seven members could be got together in New York and constitute a quorum and bind the Board of Direction in a way that we don't want to have done by a small number of men. We want to have a full discussion by the full Board of Direction and have the action of a majority of them.

THE SECRETARY.—For the sake of the record I should like to say that five constitute a quorum.

MR. CROES.—Five, according to the Constitution, are a quorum, and five members can bind the Board. Now, I do not want to reveal any secrets, or anything, but I know there is one member of the Board of Direction, when this matter first came before them at an informal meeting, and his attention was called to the constitutional provisions which seemed to require delay, who said that this was a case of the application of the old saying, "What is the Constitution among friends?" And he wanted to pass it right off. I don't know how the Board of Direction stands; nobody knows; but they all want to know something about it, and they cannot do it in a limited time, and they must have plenty of time to consider it before they can present it to the Society, or present the report of any committee that can be made. We have got to have a majority of the Board of Direction, I think, and certainly the laws of the State of New York require that in any matter involving real estate, in matters relating to the purchase and sale of property and the disposition of it, it can only be determined by a vote of two-thirds of the Board of Direction, such two-thirds being all present and voting. We cannot limit the time in that way, but we can, I think, do it within a time so as to bring it up at the next Annual Meeting.

I do not want to see any delay; I want the matter brought thoroughly before the Society and discussed, but I do not want to put it in the hands of five men in the City of New York to accept or to make a proposition to present to this Society for consideration—a majority out of five men who live in the City of New York, if there are five directors who live there.

MR. DAVISON.—I just wish to reply to Mr. Smith, and to say to him that there is no danger, in my mind, of the other societies going ahead and planning this building so long as this Society courteously asks the time, say six or eight months in which to make up its mind as to coming in, and I am satisfied that Mr. Carnegie will look at it in the same light, and will not care to have the societies go ahead too hastily.

MR. HANSEL.—Mr. President, it seems that the fear of some is that the option on certain land on Thirty-ninth Street may expire. I would suggest that there is another location in the vicinity of Fifty-

seventh Street that perhaps could be gotten. I do not understand that there is any hurry about this thing at all.

Engineers are sometimes held out of the command of affairs because they are said to be lacking in executive ability, and I feel that organization is the thing that has made this Society. Now, to hazard our organization by giving up our voice in an organization seems to be a very foolish thing to do. I do not understand that anything that is said here to-day is to decide the acceptance or declining of the offer. It is only a talk to get at the views of the members, and if it is to be decided to-day, I certainly would vote against accepting the offer as it is now made.

I am unfortunate in that I am also a member of the Engineers' Club (laughter); it seems that I am unfortunate, although I am happy to say that I am a member of that Club. Some engineers are afraid that they are on the side of commercial engineering. I am, and I am trying to get stronger on that side every day (laughter). If an engineer has not anything to sell he does not belong to our Society, because he sells his talent and his skill, if he has anything at all. All engineers are eligible to our Society. I don't say that all who say they are engineers are, but all engineers are eligible to the American Society of Civil Engineers.

The American Society of Civil Engineers, as I understand it, is called civil engineers simply because they are an independent association and are not in the service of the Federal Government, and if they are to preserve their independence, it seems to me that, under any conditions of the acceptance of this offer, they should have their home as it is now. I certainly would never consent to give up my home to share in a hotel, and I want to ask if it is in order to suggest a specific time for a special meeting, say, sixty or ninety or one hundred and twenty days, or ten months, if you please, from now—a specific time for a special meeting. As I understand it, there are only two opportunities for a business meeting, at the Annual Meeting and at the Annual Convention, and it seems to me a special meeting should be called for the consideration of a subject that is, to my mind, exceedingly important. (Applause.)

MR. SMITH.—I would like to ask a question of the Secretary which is pertinent. I don't think a great many of us here know about our own real estate. It has been stated that it was worth about a quarter of a million, and probably it is. I want to ask the Secretary whether it is property that can easily be disposed of, on account of the nature of the building and the neighborhood, and what his estimate is of the probable value that we could get for it if we sold it.

THE SECRETARY.—Mr. President, recent inquiry as to the value of property in the immediate vicinity of the Society House leads me to suppose that it is worth about \$70 000 for a 25-ft. lot, and that you



cannot get it for \$100 000; that is about all I can say as to the value of the land.

MR. SMITH.—Well, our 50-ft. lot would be worth about \$200 000?

THE SECRETARY.—We paid \$40 000 per lot, or \$80 000 for the 50 ft. If the present building were not on those lots I believe they could be sold for \$150 000 or \$160 000 at any time.

MR. SEAMAN.—What did the building cost?

THE SECRETARY.—The building itself, about \$90 000, I think, as near as I can remember it.

MR. SMITH.—Has there been any estimate as to how much it could be sold for to remain as it is, for other purposes, public purposes?

THE SECRETARY.—That is a difficult matter. You would have to find a customer for it, find somebody who would fit into it. As a matter of fact, it seems to me that that building would lend itself very well indeed to almost any not too large club. It is so arranged that club kitchens could be installed; there is ample space for that in our present storage room, and the larger rooms for dining rooms, and all that sort of thing, and if you leave out the question of sleeping apartments, which almost all New York clubs are coming to now, it would be an ideal small clubhouse, although built entirely for the purposes of our Society.

MR. SMITH.—Would it work in connection with art schools or something of that kind? We seem to be in an artistic neighborhood. Could it be used for any artistic purposes?

THE SECRETARY.—I should think it might; I can see no reason why not. It has good light.

MR. HANSEL.—Mr. President, I asked if it was in order to name a special day or a day for a special meeting to consider this subject.

THE PRESIDENT.—That may be offered as an amendment to the resolution which Mr. Haines has proposed.

MR. HANSEL.—Well, I did not know but that if it was offered it would conflict with the Constitution. I understand that any new business has to come up at either the Annual Meeting or the Annual Convention, and I ask for information, Mr. President.

THE PRESIDENT.—We are advised by counsel that it is perfectly legal for the Board of Direction or for this Convention to accept or reject the Carnegie proposition if that action was thought wise. It is perfectly legal for the Convention or for the Board at any meeting to do that.

MR. HANSEL.—Yes, but that is not the point I was after. Is it legal, under our Constitution, to appoint a day for a special meeting of the Society to consider this question?

THE SECRETARY.—There is nothing in the Constitution to prevent that, so far as I know.



Discussions at  
Joint  
[The following  
Resolutions  
(continued).]

MR. DAVISON.—I would amend Col. Haines' resolution by inserting in it the words "the Annual Meeting" of the Society.

EMIL SWENSSON, M. Am. Soc. C. E.—I second the motion.

THE PRESIDENT.—The Secretary will read the resolution.

THE SECRETARY.—It is the sense of this meeting that the letter-ballot called for in the resolutions should be presented to the Society with the usual sixty days' notice, and opportunity for discussion in business meeting.

THE PRESIDENT.—The Chair understands that Mr. Haines offers that as an amendment to the resolution which is before the meeting. That is the only way it can have consideration.

MR. HAINES.—Yes, sir.

MR. CATT.—I will second Mr. Haines' motion.

THE PRESIDENT.—And Mr. Davison's amendment to this is what?

THE SECRETARY.—That it is the sense of this meeting that the letter-ballot called for in the resolutions should be presented to the Society with the usual sixty days' notice and opportunity for discussion at the next Annual Meeting.

MR. HARROD.—I second that.

THE PRESIDENT.—That is Mr. Haines' resolution as amended by an amendment offered by Mr. Davison. Are there any remarks?

MR. DAVISON.—I would suggest the Annual Meeting, for the reason that any other meeting would generally be attended by the local members in New York alone, while the Annual Meeting will be attended by the members at large, and I am satisfied, from the interest displayed in this meeting, that we will have a rousing old meeting if it should go through.

MR. SMITH.—I understand that this vote now is on the amendment to Mr. Haines' resolution, and I certainly hope it will not go through because it takes it out of the power of the Board to act quickly if they want to.

(Cries of "Question"!)

THE PRESIDENT.—The motion is on the provision that the matter will be considered at the Annual Meeting of the Society.

The motion, being put, was carried.

THE PRESIDENT.—Now the question before the meeting is the resolution offered by Col. Haines as amended. All in favor of Col. Haines' amendment as read and amended, say aye.

The motion was carried.

THE PRESIDENT.—The question is now on the resolutions offered by the Board as amended by Mr. Haines' resolution?

MR. HARROD.—I would like to offer an amendment to the resolutions of the Board. There are six resolutions submitted by the Board, and I would like to offer this amendment to the third resolution. It now reads:

“ *Resolved*, that the Board of Direction be authorized to ascertain whether suitable accommodations can be obtained for the Society in the proposed new building, with provision for future needs.”

I offer as an amendment to add to that:

“ And also to make such investigations and hold such conferences as may bear upon the advisability of the acceptance of Mr. Carnegie's proposition by this Society.”

That is simply to enlarge the scope of the work of the Board of Direction. If that is passed it makes a slight change necessary in the fifth resolution that reads:

“ *Resolved*, that the Board of Direction be requested, provided it is satisfied that suitable accommodations can be obtained,” and I would amend it by inserting the words, “ and that the acceptance of the proposition is otherwise practicable.”

MR. SWENSSON.—I second that amendment.

The motion, being put, was carried.

THE PRESIDENT.—The question is now on the resolutions offered by the Board as amended.

The motion, being put to vote, was carried.\*

THE PRESIDENT.—The resolutions are adopted.

MR. HANSEL.—Mr. President, I understand that the Society, as the American Society of Civil Engineers, has never acknowledged to Mr. Carnegie the receipt of the offer which he has tendered this Association. If so, I desire to offer this resolution:

“ *Resolved*, that the American Society of Civil Engineers acknowledge the offer from Mr. Carnegie, and thank him sincerely for the opportunity, and advise him at the same time of the action to-day, and that the object of this delay is to determine and consider every feature of the situation carefully before deciding the matter.”

Resolution  
of thanks to  
Mr. Carnegie.

MR. SWENSSON.—I second the motion.

The motion, being put to vote, was carried.

THE SECRETARY.—Mr. President, the Chairman of the Local Committee, Mr. Ludlow, wishes to make some announcements as to the programme.

Announce-  
ments as to  
Programme.

MR. LUDLOW.—Mr. President, Ladies and Gentlemen: I wish to announce in reference to the programme of entertainment for to-day and to-morrow, and some other incidental matters, that this afternoon, as you will notice by the programme, our purpose is to have a trolley ride covering the most interesting portions of the city, which will require about eighty minutes, including a ride to Riverside Park and one other suburban line, and this trolley ride will end at the golf grounds, where preparations for a golf tournament by engineers is under way, and when I say it is by engineers, it means that it will outclass any championship games that have been held in Asheville for a number of years, doubtless. Mr. Hunt has the matter in charge, and anyone who desires to participate in this tournament this afternoon will report

\*The resolutions as adopted may be found on page 199.

ments  
continued).

either to Mr. Hunt or to Mr. Guild, of the Local Committee, who are making the entries and arranging the handicaps, etc.

Immediately after the adjournment of this morning's session, there is a photographer here who is very enterprising and very capable, and he tells me that he has taken all sorts of group pictures of distinguished bodies that have visited Asheville, but he has never had an opportunity of getting a picture of a number of engineers, and he is particularly anxious that he be afforded an opportunity.

A MEMBER.—Is this another question of affiliation?

MR. LUDLOW.—And while none of us care particularly about seeing our names in print, or our faces on cardboard, I would ask that immediately after adjournment just by way of courtesy to this photographer, we gather on the green on the hillside just in front of the hotel and permit him to perpetuate with the camera a memento of the occasion of this convention in Asheville.

A MEMBER.—What is the time of the trolley ride, sir?

MR. LUDLOW.—Three o'clock is the hour stated, and we will adhere to that as nearly as possible.

We have a card, handed in yesterday, which I placed in the hands of the Secretary, from the Asheville Club, a social organization, which very kindly tenders a card to all the members of the Society and guests, and the courtesies of the club house for a period of fifteen days.

The courtesies of the Golf Club have also been extended, which I believe was announced yesterday, by our Secretary, from the platform.

As to the matters for to-morrow, I think that everything is quite fully stated on the printed programme. To-morrow evening, as we return from Overlook Mountain, we will have some entertainment here at the hotel.

On Friday, as you will note by the programme, we have booked the ride to Biltmore. For this drive we have arranged with the liveryman—they have a liverymen's association here, and they have agreed to provide carriages to accommodate the entire party, all nice vehicles that will be comfortable, as well as pleasant to see, and they will be here at some hour on Friday morning to arrange the matter. I think the hour for the Biltmore drive will be determined largely by the condition of the weather on Friday morning, if we find that it is practicable and no other conflicting engagements have been made. For this occasion it has been arranged with the local liveryman that carriages will be furnished to hold as many as they will accommodate comfortably, three, four, or half a dozen, and that instead of each carriage being paid for separately, there will be tickets furnished, and they will be on sale by to-morrow at \$1 per person, which will include the carriage drive through Biltmore and Victoria Park, embracing a drive of about four or five hours.

I would say in passing, that the Local Committee would like very much to have included this in the provisions they have made for your pleasure, but the Secretary says that the members of the American Society of Civil Engineers don't like to have things paid for for them; they like, at least, to think they are doing things themselves (applause and laughter), so we have compromised the matter and will let you pay for your tickets for the Biltmore drive. \*

THE SECRETARY.—Mr. President, I would like to announce that through the kindness of Herbert M. Wilson, M. Am. Soc. C. E., geological sheets of Asheville and the vicinity are in the office of the Secretary and may be had upon application. They will doubtless be found of interest to our members in traveling around here.

MR. LUDLOW.—I have one more announcement to make. The Southern Railway ticket agent has just come to see me as to the return trips and the accommodations for sleepers, etc. It distresses us to think about return trips so early, but perhaps for convenience and comfort it had better be mentioned. I have arranged with the Division Passenger Agent that he be here himself, or have a representative here at the hotel to-morrow evening at nine o'clock to make bookings for the return trip on the Pullman service, and he is anxious to get this information as early as possible, so as to furnish plenty of cars and accommodations. He states in confidence that he will endeavor to furnish every one with lower berths and drawing-room space, so any of you who have fixed the time of your departure by to-morrow night can see the ticket agent and secure your reservations.

Adjourned.

## EXCURSIONS AND ENTERTAINMENTS DURING THE THIRTY-FIFTH ANNUAL CONVENTION.

The arrangements for the Convention were in the hands of the following Committees:

### *Committee of the Board of Direction:*

J. JAMES R. CROES, *Chairman*;

GEORGE H. PEGRAM,

CHAS. WARREN HUNT.

### *Committee of Local Members:*

J. L. LUDLOW, *Chairman*;

WILLIAM CAIN,

WILBUR F. FOSTER,

GEORGE W. FRANK,

J. C. GUILD,

J. N. HAZLEHURST,

W. B. W. HOWE,

W. A. LELAND,

J. IMBRIE MILLER,

J. A. MONTGOMERY,

E. T. D. MYERS,

ARTHUR PEW,

GEORGE O. TENNEY,

NISBET WINGFIELD.

By courtesy of the Pennsylvania and the Southern Railroads, the members of the Society and their guests were accommodated in special cars from New York to Washington, and in a special train from Washington to Asheville. The party left New York at 11 A. M. on Monday, June 8th, and arrived at Asheville on the following day at 9 A. M.

The Trunk Line, Southeastern, and Central Passenger Associations, granted a rate of one first-class fare, plus 25 cents, for the round trip to and from Asheville, from all points in their territories.

In the afternoon of Wednesday, June 10th, by the courtesy of the Asheville Electric Company, a trolley trip around Asheville was made by a large party of members and guests. The trip terminated at the Swannanoa Country Club, where, by courtesy of the club, a special golf competition was held.

On Wednesday evening the members and guests of the Society were received by the Hon. Charles B. Aycock, Governor of North Carolina.

On Thursday afternoon, by invitation of Richard S. Howland, Esq., President of the Asheville and Craggy Mountain Railroad Company, the members and guests visited Overlook Park, on Sunset Mountain, where they spent the afternoon and enjoyed a "Barbecue" prepared especially for them. The features of the Asheville and Craggy Mountain Electric Railroad were described in a pamphlet by R. H. Tingley, M. Am. Soc. C. E., who built the road up the mountain.

In the evening a concert and Southern Plantation Entertainment was enjoyed by a large audience.

On Friday a large party took carriages and drove through the grounds of "Biltmore," the estate of George W. Vanderbilt, Esq.



## THE ATTENDANCE AT THE THIRTY-FIFTH ANNUAL CONVENTION.

The following 122 members were in attendance:

Allen, C. H.....	New York City	Hansel, Charles.....	New York City
Atkinson, J. B.....	Earlington, Ky.	Harlow, J. Hayward, Jr.,	Conowingo, Md.
Bacon, J. W.....	Danbury, Conn.	Harris, Van Alen,	San Juan, Porto Rico
Baird, Howard C....	Phoenixville, Pa.	Harrod, B. M....	New Orleans, La.
Barnsley, George T....	Oakmont, Pa.	Hatt, W. K.....	Washington, D. C.
Betts, E. E.....	Chattanooga, Tenn.	Hermann, E. A.....	St. Louis, Mo.
Braune, G. M....	Birmingham, Ala.	Hider, Arthur ....	Greenville, Miss.
Brenneke, W. G.....	St. Louis, Mo.	Hinckley, J. F . . .	St. Louis, Mo.
Breuchaud, J.....	Yonkers, N. Y.	Horton, Horace E.....	Chicago, Ill.
Brooks, Fred.....	Boston, Mass.	Hotchkiss, C. W.....	Chicago, Ill.
Cain, William.....	Chapel Hill, N. C.	Howard, John Lewis..	Boston, Mass.
Carson, W. W.....	Knoxville, Tenn.	Hunt, Chas. Warren..	New York City
Catt, George W.....	New York City	Hyde, Charles Gilman,	Harrisburg, Pa.
Chapin, L. E.....	Canton, Ohio	Jackson, J. M....	Parkersburg, W. Va.
Chester, J. N.....	Pittsburg, Pa.	Johnson, A. L . . .	St. Louis, Mo.
Clark, L. V.....	Philadelphia, Pa.	Johnson, J. M.....	Louisville, Ky.
Clayton, R. M.....	Atlanta, Ga.	Johnson, L. J.....	Cambridge, Mass.
Condon, T. L. . . . .	Chicago, Ill.	Judson, Wm. Pierson.	Albany, N. Y.
Connor, E. H....	Leavenworth, Kans.	Juengst, H. F. . .	Birmingham, Ala.
Cooper, Samuel L. . .	Yonkers, N. Y.	Kendrick, J. W....	Birmingham, Ala.
Crane, Albert S . . . .	Chicago, Ill.	Kimball, Frank C. . .	Knoxville, Tenn.
Croes, J. J. R.....	New York City	King, Paul S.....	New York City
Cummings, Robert A..	Pittsburg, Pa.	King, Wallace, Jr....	New York City
Davis, Chas . . . .	Allegheny, Pa.	Lesley, R. W.....	Philadelphia, Pa.
Davison, George S....	Pittsburg, Pa.	Lowinson, O . . . .	New York City
Diebitsch, Emil.....	New York City	Lucas, E. W. Van C.	Memphis, Tenn.
Douglas, B.....	Detroit, Mich.	Ludlow, J. L.....	Winston, N. C.
Dyer, Arthur J....	Nashville, Tenn.	McCalla, R. C.....	Tuscaloosa, Ala.
Ellis, John W. . . .	Woonsocket, R. I.	McDonald, Hunter..	Nashville, Tenn.
Foster, E. H.....	New York City	McLain, L. R. . .	St. Augustine, Fla.
Francis, George B. . .	New York City	McMinn, T. J.....	New York City
Frank, George W.	New London, N. C.	Maltby, F. B.....	Memphis, Tenn.
Gillespie, R. H.....	New York City	Maxwell, J. R.....	Newark, Del.
Goodell, John M.....	New York City	Martin, William.....	Bellevue, Pa.
Grantham, Herbert T.,	Philadelphia, Pa.	Melvin, David N.	Linoleumville, N. Y.
Green, Bernard R.	Washington, D. C.	Miller, J. Imbrie....	Montreat, N. C.
Guild, J. C.....	Chattanooga, Tenn.	Miller, Rudolph P. . .	New York City
Haines, H. S.....	Detroit, Mich.	Modjeski, Ralph.....	Chicago, Ill.
Hanna, John V.....	St. Louis, Mo.		

Montfort, R. ....	Louisville, Ky.	Shedd, Edward W. ....	Providence, R. I.
Montgomery, J. A. ....	Birmingham, Ala.	Shedd, J. Herbert ....	Providence, R. I.
Morris, Marshall. ....	Louisville, Ky.	Shryock, Joseph G. ....	Philadelphia, Pa.
Myers, E. T. D., Jr. ....	Richmond, Va.	Smith, Oberlin ....	Bridgeton, N. J.
Myers, E. W. ....	Greensboro, N. C.	Snow, J. P. ....	Boston, Mass.
		Swensson, Emil. ....	Pittsburg, Pa.
Nicholson, George B. ....	Covington, Ky.		
Noble, Alfred. ....	New York City.	Thacher, Edwin. ....	New York City
		Tillson, Geo. W. ....	Brooklyn, N. Y.
Osborn, Frank C. ....	Cleveland, Ohio	Tingley, R. H. ....	New York City
		Trundle, H. H. ....	Leesburg, Va.
Pegram, Geo. H. ....	New York City		
Pew, Arthur. ....	Bolton, Ga.	Van Horne, John G. ....	New York City
Polk, Wm. Anderson. ....	New York City		
Pope, Macy S. ....	Boston, Mass.	Wadsworth, J. E. ....	New York City
Potter, H. W. ....	New York City	Wagner, Samuel ....	Philadelphia, Pa.
Pressey, H. A. ....	Washington, D. C.		
		Wallace, J. F. ....	Chicago, Ill.
Reed, W. Boardman. ....	New York City	Warder, J. H. ....	Chicago, Ill.
Riggs, M. J. ....	Toledo, Ohio	Wegmann, E. ....	Katonah, N. Y.
Ruggles, Charles A. ....	New York City	Wiley, Wm. H. ....	New York City
Russell, S. Bent. ....	St. Louis, Mo.	Wilson, H. F., Jr. ....	Birmingham, Ala.
		Wilson, H. M. ....	Washington, D. C.
Schaub, J. W. ....	Chicago, Ill.	Winfree, P. B. ....	Lynchburg, Va.
Schneider, C. C. ....	Pencoyd, Pa.	Wingfield, Nisbet. ....	Augusta, Ga.
Seofield, E. M. ....	Pittsburg, Pa.	Wölfel, Paul L. ....	Philadelphia, Pa.
Seaman, Henry B. ....	New York City	Worcester, J. R. ....	Boston, Mass.

The total registered attendance at the Convention was as follows:

Members of the Society, in all grades. ....	122
Guests, including ladies. ....	133
Total. ....	255

## ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

## MEETINGS.

**Wednesday, September 2d, 1903.**—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper entitled "An Experimental Study of the Resistances to the Flow of Water in Pipes," by Augustus V. Saph, Assoc. Am. Soc. C. E., and Ernest W. Schoder, Jun. Am. Soc. C. E., will be presented for discussion. This paper was printed in *Proceedings* for May, 1903.

**Wednesday, September 16th, 1903.**—8.30 P. M.—At this meeting two papers will be presented for discussion, as follows: "Theory of Centrifugal Pumps and Fans; Analysis of their Action, with Suggestions for Designs," by Elmo G. Harris, M. Am. Soc. C. E. (printed in *Proceedings* for May, 1903); and "Tests of the Efficiency of Hoisting Tackle," by S. P. Mitchell, M. Am. Soc. C. E., printed in this number of *Proceedings*.

**Wednesday, October 7th, 1903.**—8.30 P. M.—A regular business meeting will be held. Ballots for membership and ballots on the proposed amendment to the Constitution will be canvassed, and a paper by Francis Robert Johnson, M. Am. Soc. C. E., entitled "South African Irrigation," will be presented for discussion. This paper is printed in this number of *Proceedings*.

**Wednesday, October 21st, 1903.**—8.30 P. M.—At this meeting two papers will be presented, as follows: "Some Railway Construction in Oklahoma," by A. G. Allan, Assoc. M. Am. Soc. C. E.; and "The Fatigue of Cement Products," by J. L. Van Ornum, M. Am. Soc. C. E. These papers are printed in this number of *Proceedings*.

## SEARCHES IN THE LIBRARY.

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many such searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction to the members who have made use of the resources of the Society in this manner has been expressed

frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling compared to the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

Copies of all lists of references are filed, so that in many cases it is only necessary to make a typewritten copy, which reduces the cost of searches for members to a minimum.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

## ACCESSIONS TO THE LIBRARY.

From May 13th to August 8th, 1903.

## DONATIONS.\*

## TREATISE ON HYDRAULICS.

By Mansfield Merriman. Eighth Edition, Rewritten and Enlarged, Cloth, 9 x 6 ins., 8 + 585 pp., illus. New York, John Wiley & Sons, 1903. \$5.00.

Since the publication of the first edition of this treatise, in 1889, many advances have been made in hydraulics. Some of these have been noted briefly in later editions, but to record and correlate them properly it has become necessary to rewrite and reset the book. The same plan of arrangement as in former editions has been followed, but two new chapters have been added, one on Hydraulic Instruments and Observations, which treats of the methods of measuring pressures and velocities, and another on Pumps and Pumping, in which the various machines for raising water are discussed from a hydraulic point of view. Many new examples and problems are given, and in these the author has endeavored, not only to simplify the theory of the subject, but also to illustrate the conditions of actual practice. Historical notes and references to hydraulic literature are presented with greater fullness than before. While the main purpose in rewriting the book has been to keep it abreast with modern progress, the attempt has also been made to present the subject more concisely and clearly than before, in order to advance the interests of thorough education and to promote sound engineering practice. The chapter headings are: Fundamental Data; Hydrostatics; Theoretical Hydraulics; Instruments and Observations; Flow through Orifices; Flow over Weirs; Flow through Tubes; Flow through Pipes; Flow in Conduits; Flow of Rivers; Water Supply and Water Power; Dynamic Pressure of Water; Water Wheels; Turbines; Naval Hydromechanics; Pumps and Pumping; Tables for English Measures; Tables for Metric Measures; Tables for all Measures. There is an index of nine pages.

## MUNICIPAL PUBLIC WORKS.

Their Inception, Construction and Management. By S. Whinery. New York, The Macmillan Company, 1903. \$1.50 net.

The preface states that this book is intended for the inexperienced city official and for the urban citizen. The veteran in municipal service and the student of municipal administration will not find in the book much that is new to them, although they may find that some matters are presented from points of view different from those to which they have been accustomed. The author has tried to avoid technical treatment of the subjects, and has introduced statistics and details only where they seemed necessary to illustrate or enforce the general statements. The idea has been to deal with principles rather than with details of practice. The Contents are: Importance of Municipal Public Works; Municipal Organization; Preparations for Municipal Work; Direct Work *vs.* Contract Work; Advertising, Opening Bids, and Awarding Contracts; The Contract; The Contractor; The Supervision of Public Work; Maintenance and Repair of Public Work; Economy, Real and False; Guaranteeing Public Work; Special Assessments; Municipal Accounts and Uniform Accounting; Municipal Ownership; Quasi-Public Corporations and their Control.

## PRACTICAL FARM DRAINAGE.

Why, When, and How to Tile Drain. By C. G. Elliott. Cloth, 7½ x 5 ins., 7 + 92 pp., illus. New York, John Wiley & Sons, 1903. \$1.00.

This book is intended for those who are interested in the subject of farm drainage. It gives to the farmer in a concise and plain manner, the elementary knowledge of why, when, where and how to drain his farm. The practical methods described have been well tested, and are now in constant use by practical men. The chapter headings are: Soils and the Relation of Drainage to Them; Action of Drains Upon the Soil; Leveling and Locating Drains; Depth and Size of Drains; Practical Details of the Work; Ditching Machines; Cost and Profit; Road Drainage.

## EARTHWORK AND ITS COST.

By Halbert Powers Gillette, M. Am. Inst. M. E. Cloth, 8 x 5 ins., 10 + 244 pp., illus. New York, The Engineering News Publishing Co., 1903. \$2.00.

The author states in the preface that his principal object in this book has been to outline rational methods and rules to be used in cost calculation of earthwork, and that

\* Unless otherwise specified, books in this list have been donated by the Publishers.



The only way a truly economic design for a structure can be made is by knowing every item of material cost; and this in turn can only be known by a study of the tools and methods used in construction. As a class book and as an office book, this volume is intended to be of service in indicating the proper methods of solving problems of engineering economics in general, as well as those of earthwork in particular. The Contents are: Introduction; Earth Shrinkage; Earth Classification; Cost of Loosening and Shoveling; Cost of Dumping, Spreading, Rolling, etc.; Cost by Wheelbarrows and Carriage; Cost by Wagons; Cost by Buck and Drag Scrapers; Cost by Wheel Scrapers; Cost by the Elevating Grader; Cost by Steam Shovels; Cost by Cars; How to Handle a Steam Shovel Plant; Summary and Table of Costs; Cost of Trenching and Pipe Laying; Type Cost of Hydraulic Excavation; Cost of Dredging; Miscellaneous Cost Data; Frozen Earth, Earth and Earth Structures; Appendix A, Rapid Field and Office Survey Work; Appendix B, Overhaul Calculation; Appendix C, A Small "Home Made" Dipper Dredge or Steam Shovel. There is an index of ten pages.

#### NOTES ON TRACK

Construction and Maintenance. By W. M. Camp, M. Am. Soc. C. E. Cloth, 10 x 7 ins., 8 + 124 pp., illus. W. M. Camp, Chicago, 1903. \$3.00. (For the foreign trade issued in two volumes at \$3.50.)

The author states in the preface that this book treats of the construction and maintenance of railroad track from the standpoints both of the trackman and the engineer, and gives a thorough-going treatment of details, as well as of general principles. The book was published originally as a series of articles in the *Railway and Engineering Review*, but in the revision for its publication in book form, the volume of matter contained in the articles has been greatly increased and elaborated upon. The aim has been to follow practice down to date and give reference to all new improvements which seem likely to assume future importance. Every phase of track construction and track work has been treated, special attention having been paid to costs and other data, and particularly to the development of modern labor-saving machinery in track work. The chapter headings are: Track Foundation; Track Materials; Track-Laying; Ballasting; Curves; Switching Arrangements and Appliances; Track Maintenance; Double-Track-ing; Track Tools; Work Trains; Miscellaneous; Organization; Supplementary Notes and Tables. There is an index of eighteen pages.

#### THE CAR BUILDERS' DICTIONARY.

An Illustrated Vocabulary of Terms which Designate American Railroad Cars, Their Parts, Attachments, and Details of Construction. Compiled for the Master Car Builders' Association, by Rodney Hitt, Assisted by A. M. Waitt, J. S. Lentz, W. P. Appleyard. 1903 Edition. Morocco, 12 x 8½ ins., 374 pp., illus. New York, *The Railroad Gazette*, 1903. \$5.00.

The original idea of the Car Builders' Dictionary, as stated in the preface, was to standardize car-building language. Since 1895, however, the book has been used largely as a guide for ordering, designing and specifying cars, and parts of cars, and the present edition has been prepared with a view to facilitate its use for such purposes. While the definitions have not been materially changed in this edition, they have been carefully edited in order to eliminate the ancient history which many of them contained, to condense and modernize the descriptive matter, and to make that part of the book more of a ready-reference section than an encyclopaedia. The number of illustrations has been reduced from 5,683 in 1895 to 4,971 in 1903, the object being to show nothing that is experimental or rapidly going out of use, but only such devices and cars as are in general use at this time. Wherever possible the name of the maker of each device has been placed under the engraving, and in many cases, the maker's designation, or number of the part has been preserved. One new feature has been added in the general arrangement of the illustrated pages, that of Car-Shop Machinery, the engravings, however, being limited to a few of the most common forms of wood-working machines and pneumatic tools. Particular attention has been given to the selection of drawings of freight-car bodies. Since 1895, the use of steel cars has rapidly increased, and those illustrated represent the latest types, and may be taken as good examples of present practice. Drawings for wooden cars are given more in detail. The illustrations of the types of the standard systems of framing for passenger cars cover a large proportion of the passenger equipment now in use. The treatment of electric cars has been meager. In preparing that part of the book which includes the Master Car Builders' standards and recommended practice, the aim has been to preserve as far as possible the order in which the engravings appear in the *Proceedings* of the Association, and under each engraving is given the reference to the plates shown in the *Proceedings* for 1902. With one or two exceptions all the historical and descriptive matter printed under the head of Rules for Interchange of Traffic, and Standards and Recommended Practices, has been included in the section of the book devoted to definitions. There is an index of two pages to engravings.

**DESIGN OF DYNAMOS.**

By Silvanus P. Thompson. Cloth, 9 x 6 ins., 7 + 253 pp., illus. New York, Spon & Chamberlain, 1903. \$3.50.

The author states that these notes on Dynamo Design are not intended to supersede the more complete handbooks on the special branch of electrical engineering of which this is only a part, and having been designed primarily for his own students, are purposely confined to continuous-current generators. As the work will be used by engineers, chiefly in Great Britain, in her Colonies, and in the United States, the calculations and data have been expressed in inch measures, but the author has adopted throughout the decimal subdivision of the inch, small lengths being given in mils, and small areas of cross-section in square mils, or, sometimes also, in circular mils, to suit American practice. In the section on Armature Winding Schemes, special attention is given to series parallel windings, and to the doctrine of the "equivalent ring." The chapter headings are: Dynamo Design as an Art; Magnetic Calculations as Applied to Dynamo Design; Copper Calculations; Coil Windings; Insulating Materials, and their Properties; Armature Winding Schemes; Estimation of Losses, Heating and Pressure Drop; The Design of Continuous-Current Dynamos; Examples of Dynamo Design; Appendix I, Wire-Gauge Tables (Copper), British; II, Wire-Gauge Tables (Copper), American; III, Schedules for Design of Continuous-Current Dynamos. There is an index of thirteen pages.

**A MANUAL OF USEFUL INFORMATION AND TABLES APPERTAINING TO THE USE OF STEEL.**

As Manufactured by the Passaic Steel Company, Paterson, N. J. For Engineers, Architects and Builders. By Geo. H. Blakeley, M. Am. Soc. C. E. Leather, 7 x 4 ins., 324 pp., illus. New York, 1903. \$2.00. (Donated by the Author.)

The present edition remains the same as the 1899 and 1901 editions, with a few minor changes. It is intended to supply special information and tables of value and service to those engaged in the design of structural steel work. Only such matter is given as the author has found to be of service in his own practice. The Contents are: Shapes Manufactured by Passaic Steel Company; Structural Details; Properties of Passaic Structural Shapes; Traverse Strength of Passaic Structural Shapes; Beam Girders; Strength and Deflection of Beams; Moments of Inertia of Usual Sections; Fireproof Construction; Building Laws; Spacing of I-Beams for Floors; Riveted Girders; Suddenly Applied Loads; Lintels; Columns; Properties and Safe Loads; Foundations; Wind Bracing, Wooden Beams; Wooden Columns; Roofs; Bridge Trusses; Passaic Standard Railroad Turntables; Specifications for Structural Steel; Corrugated Iron; Rivets and Pins; Bolts and Nuts; Buckle Plates; Sleeve Nuts; Loop Rods; Eye Bars and Pins; Clevises; Linear Expansion by Heat; Areas and Weights of Bars, Flats and Plates; Miscellaneous Tables; Ultimate Strengths of Materials; Weights of Various Substances; Mensuration; Areas and Circumferences of Circles; Weights and Measures. There is an index of seven pages.

**HENDRICKS' COMMERCIAL REGISTER**

Of the United States. For Buyers and Sellers. Especially Devoted to the Interests of the Architectural, Mechanical, Engineering, Contracting, Electrical, Railroad, Iron, Steel, Mining, Mill, Quarrying and Kindred Industries. Twelfth Annual Edition. Cloth, 10 x 7½ ins., 46 + 1128 pp. New York, Samuel E. Hendricks Co., 1902. \$6.00.

This book is an annual index of the above-mentioned industries, containing names, addresses and business classifications, with full lists of the manufacturers of, and dealers in, everything used in the manufacture of material, machinery and apparatus for these industries. There is an index of forty-six pages.

**TRAITÉ DE LA CONDENSATION.**

Condensations indépendantes; Condensations centrales; Refroidissement artificiel de l'eau. A l'usage des Constructeurs de machines à vapeur, des Ingénieurs d'usines métallurgiques, de mines, de fabriques de sucre, de produits chimiques, etc. . . et des Elèves des Ecoles Industrielles. Par F. J. Weiss. Traduit par E. Hannebique. Sur la première édition allemande revue et augmentée par l'auteur. Paper, 10 x 6½ ins., 10 + 507 pp., illus. Paris, Vve. Ch. Dunod, 1903. 20 francs.

This work, notwithstanding its title, deals not only with condensation in the strict sense of the word, but also with all questions connected with condensation. The Con-

tents are: Condensation par Mélange; Condensation par Surface; Temps nécessaire pour établir le vide dans le Condenseur; Puissance nécessaire; Utilité de la Condensation; Calcul complet d'une grande Condensation centrale; Conduite d'échappement; Régulation des machines à Condensation; Distribution Weiss; De la Condensation dans les Machines; Refroidissement artificiel de l'eau; Tables de Regnault.

#### GEMEINFÄSSLICHE DARSTELLUNG DES EISENHÜTTENWESENS.

Herausgegeben vom Verein Deutscher Eisenhüttenleute in Düsseldorf. 5. Auflage. Cloth, 9 x 6 ins., 12 + 164 pp., illus. A. Bagel, Düsseldorf, 1903. 3 marks.

The first part of the fifth edition remains almost entirely unchanged, whereas the second part has received many additions which correspond to the changes in the economical situation of the iron industry. The appendix has also been enlarged by lists of German beam, rail, bar, hoop, rough tin, refined tin, wire, and pipe rolling mills, as well as the German cast-iron pipe works. The chapter headings are: Die Darstellung des Eisens; Die Darstellung des Roheisens; Die Darstellung des schmiedbaren Eisens; Die Formgebungsarbeiten; Wirtschaftliche Bedeutung des Eisengewerbes; Anhang.

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**Elektromechanische Konstruktionen.** Eine Sammlung von Konstruktionsbeispielen und Berechnungen von Maschinen und Apparaten für Starkstrom. Zusammengestellt und erläutert von Gisbert Kapp. Zweite, verbesserte und erweiterte Auflage. Berlin, Julius Springer, 1902.

**Electrotechnik in Einzeldarstellungen.** Unter Mitwirkung hervorragender Fachmänner herausgegeben von Dr. Gustav Benischke. Pts. 2 and 3. Braunschweig, Friedrich Vieweg und Sohn, 1902.

**The Induction Motor: Its Theory and Design Set Forth by a Practical Method of Calculation.** By Henri Boy de la Tour. Translated from the French by C. O. Mailloux, M. A. I. E. E., M. I. E. E. New York, McGraw Publishing Company, 1903.

**Handbuch der Ingenieurwissenschaften.** Vol. 2, Pt. 6, Vol. 4, Pt. 2. Dritte vermehrte Auflage. Leipzig, Wilhelm Engelmann, 1903.

**Das Entwerfen und Berechnen der Verbrennungsmotoren.** Handbuch für Konstrukteure und Erbauer von Gas- und Olkraftmaschinen. Von Hugo Güldner. Berlin, Julius Springer, 1902.

**Lehrbuch der Ingenieur- und Maschinen-Mechanik.** Mit den nöthigen Hilfslehren aus der Analysis für den Unterricht an technischen Lehranstalten sowie zum Gebrauche für Techniker bearbeitet von Julius Weisbach. Fünfte verbesserte und vervollständigte Auflage bearbeitet von Gustav Hermann. 7 vol. Braunschweig, Friedrich Vieweg und Sohn, 1876-1901.

**The Slide Valve and Its Functions,** with Special Reference to Modern Practice in the United States. By Julius Begtrup. New York, D. Van Nostrand Company; London, E. and F. N. Spon, Limited, 1902.

**Siderology: The Science of Iron.** By Hanns Freiherr v. Jüptner. Translated from the German by Charles Salter. London, Scott, Greenwood & Co., 1902.

**Die Drahtseile.** Alles nothwendige zur richtigen Beurtheilung, Construction und Berechnung derselben. Eine der Praxis angepasste wissenschaftliche Abhandlung. Von Josef Hrabák. Berlin, Julius Springer, 1902.



**Ventilation in Mines.** By Robert Wabner. Translated from the German by Charles Salter. London, Scott, Greenwood & Co., 1903.

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PARASCHOS, GEORGE THEOPHANES.....	89 St. Botolph St., Boston, Mass.
PARKER, RICHARD DENNY.....	Care, Engr., M. of W., Houston & Tex. Cent. R. R. Co., Room 18, Grand Central Depot, Houston, Tex.
PROCTOR, RALPH FENNO.....	Care, Williams & Whitman, 702 Flatiron Bldg., New York City.

SCHUMANN, CALL JULIUS.....	Bayswater, Far Rockaway, N. Y.
TAYLOR, ALEXANDER JENIFER.....	1307 Washington St., Wilmington, Del.
TAYLOR, HOWARD FLANDERS .....	Res. Engr., Gasconade R. R. Constr. Co., Elden, Mo.
THOMPSON, WILFORD ASHFORD.....	Engr., Buehler-Cooney Constr. Co., 4636a Page Blk., St. Louis, Mo.
THOMSON, ALEXANDER, JR.....	Asst. Engr., Rapid Transit R. R. Comm., 4 Court Sq. (Res., 351a Quincy St.), Brooklyn, N. Y.
VAN PELT, SUTTON .....	Care, U. S. Engr. Office, Mobile, Ala.
WALKER, EDWARD LLOYD.....	City Hall, Meadville, Pa.
WHITSON, ABRAHAM UNDERHILL.....	Glen Cove, N. Y.
WILDES, WALDO GILMAN .....	Care, W. H. H. Gere, Div. Engr., Weighlock Bldg., Syracuse, N. Y.

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#### DEATHS.

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BOND, FREDERICK WINN .....	Elected Member, December 7th, 1898; died July 12th, 1903.
DUNHAM, CHARLES FREDERICK.....	Elected Member, April 2d, 1902; died June 13th, 1903.
FTELEY, ALPHONSE.....	Elected Member, January 5th, 1876; died June 11th, 1903.
HARDY, GEORGE RICHARDSON .....	Elected Member, November 7th, 1888; died April 2d, 1903.
JONES, BENJAMIN FRANKLIN.....	Elected Fellow, June 13th, 1870; died May 19th, 1903.
LIBBY, EDMUND DORMAN.....	Elected Member, May 6th, 1885; died April 24th, 1903.
MARTIN, CHARLES CYRIL.....	Elected Member July 10th, 1872; died July 11th, 1903.
MORISON, GEORGE SHATTUCK .....	Elected Member, January 6th, 1875; died July 1st, 1903.
MORSE, HENRY GRANT, .....	Elected Member, April 7th, 1880; died June 2d, 1903.
THOMPSON, WILLIAM GEORGE MCNEILL..	Elected Member, July 2d, 1879; died May 12th, 1903.
VANDERPOOL, EUGENE.....	Elected Member, September 2d, 1874; died July 12th, 1903.

## MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(May 12th to Aug. 8th, 1903.)

NOTE.—*This list is published for the purpose of placing before the members of the Society the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

### LIST OF PUBLICATIONS.

*In the subjoined list of articles references are given by the number prefixed to each journal in this list.*

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| <p>(1) <i>Journal</i>, Assoc. Eng. Soc., 257 South Fourth St., Philadelphia, Pa., 30c.</p> <p>(2) <i>Proceedings</i>, Engrs. Club of Phila., 1122 Girard St., Philadelphia, Pa.</p> <p>(3) <i>Journal</i>, Franklin Inst., Philadelphia, Pa., 50c.</p> <p>(4) <i>Journal</i>, Western Soc. of Engrs., Monadnock Block, Chicago, Ill.</p> <p>(5) <i>Transactions</i>, Can. Soc. C. E., Montreal, Que., Canada.</p> <p>(6) <i>School of Mines Quarterly</i>, Columbia Univ., New York City, 50c.</p> <p>(7) <i>Technology Quarterly</i>, Mass. Inst. Tech., Boston, Mass., 75c.</p> <p>(8) <i>Stevens Institute Indicator</i>, Stevens Inst., Hoboken, N. J., 50c.</p> <p>(9) <i>Engineering Magazine</i>, New York City, 25c.</p> <p>(10) <i>Cassier's Magazine</i>, New York City, 25c.</p> <p>(11) <i>Engineering</i> (London), W. H. Wiley, New York City, 25c.</p> <p>(12) <i>The Engineer</i> (London), International News Co., New York City, 35c.</p> <p>(13) <i>Engineering News</i>, New York City, 15c.</p> <p>(14) <i>The Engineering Record</i>, New York City, 12c.</p> <p>(15) <i>Railroad Gazette</i>, New York City, 10c.</p> <p>(16) <i>Engineering and Mining Journal</i>, New York City, 15c.</p> <p>(17) <i>Street Railway Journal</i>, New York City, 35c.</p> <p>(18) <i>Railway and Engineering Review</i>, Chicago, Ill., 10c.</p> <p>(19) <i>Scientific American Supplement</i>, New York City, 10c.</p> <p>(20) <i>Iron Age</i>, New York City, 10c.</p> <p>(21) <i>Railway Engineer</i>, London, England, 25c.</p> <p>(22) <i>Iron and Coal Trades Review</i>, London, England, 25c.</p> <p>(23) <i>Bulletin</i>, American Iron and Steel Assoc., Philadelphia, Pa.</p> <p>(24) <i>American Gas Light Journal</i>, New York City, 10c.</p> <p>(25) <i>American Engineer</i>, New York City, 20c.</p> <p>(26) <i>Electrical Review</i>, London, England.</p> <p>(27) <i>Electrical World and Engineer</i>, New York City, 10c.</p> <p>(28) <i>Journal</i>, New England Water-Works Assoc., Boston, \$1.</p> <p>(29) <i>Journal</i>, Society of Arts, London, England, 15c.</p> <p>(30) <i>Annales des Travaux Publics de Belgique</i>, Brussels, Belgium.</p> <p>(31) <i>Annales de l'Assoc. des Ing. Sortis des École Spéciales de Gand</i>, Brussels, Belgium.</p> | <p>(32) <i>Mémoires et Compte Rendu des Travaux</i>, Soc. Ing. Civ. de France, Paris, France.</p> <p>(33) <i>Le Génie Civil</i>, Paris, France.</p> <p>(34) <i>Portefeuille Économique des Machines</i>, Paris, France.</p> <p>(35) <i>Nouvelles Annales de la Construction</i>, Paris, France.</p> <p>(36) <i>La Revue Technique</i>, Paris, France.</p> <p>(37) <i>Revue de Mécanique</i>, Paris, France.</p> <p>(38) <i>Revue Générale des Chemins de Fer et des Tramways</i>, Paris, France.</p> <p>(39) <i>Railway Master Mechanic</i>, Chicago, Ill., 10c.</p> <p>(40) <i>Railway Age</i>, Chicago, Ill., 10c.</p> <p>(41) <i>Modern Machinery</i>, Chicago, Ill., 10c.</p> <p>(42) <i>Transactions</i>, Am. Inst. Elec. Engrs., New York City, 50c.</p> <p>(43) <i>Annales des Ponts et Chaussées</i>, Paris, France.</p> <p>(44) <i>Journal</i>, Military Service Institution, Governor's Island, New York Harbor, 50c.</p> <p>(45) <i>Mines and Minerals</i>, Scranton, Pa., 20c.</p> <p>(46) <i>Scientific American</i>, New York City, 8c.</p> <p>(47) <i>Mechanical Engineer</i>, Manchester, England.</p> <p>(54) <i>Transactions</i>, Am. Soc. C. E., New York City, \$5.</p> <p>(55) <i>Transactions</i>, Am. Soc. M. E., New York City, \$10.</p> <p>(56) <i>Transactions</i>, Am. Inst. Min. Engrs., New York City, \$5.</p> <p>(57) <i>Colliery Guardian</i>, London, England.</p> <p>(58) <i>Proceedings</i>, Eng. Soc. W. Pa., 410 Penn Ave., Pittsburg, Pa., 50c.</p> <p>(59) <i>Transactions</i>, Mining Inst. of Scotland, London and Newcastle-upon-Tyne.</p> <p>(60) <i>Municipal Engineering</i>, Indianapolis, Ind., 25c.</p> <p>(61) <i>Proceedings</i>, Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.</p> <p>(62) <i>American Manufacturer and Iron World</i>, 59 Ninth St., Pittsburg, Pa.</p> <p>(63) <i>Minutes of Proceedings</i>, Inst. C. E., London, England.</p> <p>(64) <i>Power</i>, New York City, 20c.</p> <p>(65) <i>Official Proceedings</i>, New York Railroad Club, Brooklyn, N. Y., 15c.</p> <p>(66) <i>Journal of Gas Lighting</i>, London, England, 15c.</p> <p>(67) <i>Cement and Engineering News</i>, Chicago, Ill., 25c.</p> <p>(68) <i>Mining Journal</i>, London, England.</p> |
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## LIST OF ARTICLES.

## Bridge.

- The Rupnagar Bridge, Bengal Nagpur Railway. Stephen Martin-Leake, Assoc. M. Inst. C. E. (63) Vol. cli.
- Victoria Bridge over the Brisbane River, Brisbane, Queensland. Alfred Barton Brady, M. Inst. C. E. (63) Vol. cli.
- Bridge Building and Bridge Works in the United States.\* (12) Serial beginning Jan. 16. (Series of Maximum Bending Moment.\* Arthur L. Bell. (12) May 8.
- The Kang L-wai and Y. L. Bridge at Kew. (11) Serial beginning May 15.
- The Polar Moment of Inertia, and Its Graphical Application to Riveted Joints.\* C. F. Branson; R. W. Rogers. (13) May 21.
- Steel Turf-road-riding and Wood Block Pavement for the Roadways of the Williamsburg Bridge.\* (13) May 21.
- Rail-Concrete Masonry on the New York, Ontario & Western.\* (15) May 22.
- Standard Plans for Bridges on the Atchison, Topeka & Santa Fé Ry.\* (13) May 28.
- New Vauxhall Bridge. (12) Serial beginning May 29.
- An Exhibit of Some Curious Lattice Trusses.\* Geo. N. Lindsay. (4) June.
- The Stresses on Skew Arches.\* W. C. Kernot, M. Am. Soc. C. E. (Paper read before the Victorian Inst. of Engrs. (13) June 11.
- Reinforced Concrete Bridge over River Des Peres, Forest Park, St. Louis, Mo.\* (13) June 11.
- Bridges on the Eastern Illinois & St. Louis.\* (15) June 12.
- The Springfield Bridge. (14) June 13.
- The Karitan River Stone Arch Bridge of the Pennsylvania R. R., at New Brunswick, N. J. (13) June 18.
- The Paderno Wrought-Iron Arch Viaduct.\* (13) June 18.
- Concrete Arch Bridge over the San Juan River on the Road from Santiago de Cuba to Caney.\* Eduardo J. Chabas, M. Am. Soc. C. E. (13) June 18.
- The Merits of Grillage on a Pile Foundation.\* J. C. Hain. Paper read before Iowa Ry. Club. (15) June 19.
- Comparison of Eye-Bar Chains with Steel-Wire Cables for the Manhattan Bridge. (13) June 25; (14) June 27.
- Wire Cables *versus* Eye-bar Chains for Suspension Bridges. Wilhelm Hildenbrand, M. Am. Soc. C. E. (14) July 4.
- The Proposed Brooklyn Bridge Terminal and New York Municipal Building.\* (13) July 1.
- Scherzer Rolling-lift Plate Girder Railroad Bridges.\* (14) July 11.
- Pymont Bridge, Sydney, Australia.\* John Plummer. (16) July 11.
- Replacing a Suspension Bridge by a Masonry Arch.\* (13) July 16.
- A Concrete-Steel Three-Hinged Arch Bridge.\* (13) July 15.
- The Widening of London Bridge.\* Harold J. Shepstone. (19) Aug. 1.
- The Plattsmouth Bridge of the Burlington.\* (15) Aug. 7.
- Erection of Manhattan Valley Viaduct.\* (14) Aug. 8; (20) July 30.
- The Great Miami River Highway Bridge, Dayton, Ohio.\* (14) Aug. 8.
- Le Pont de Gignac sur l'Hérault, 1774-1810; Notice Descriptive et Historique. F. De Dartien. (43) 4<sup>e</sup> Trimestre, 1902.
- Pont Suspendu Semi-Rigide de Vernaison (Rhône).\* Ch. Dantin. (33) July 4.

## Electrical.

- High-Speed Electrical Generating Plant. Thomas Herbert Minshall. (63) Vol. cli.
- The Operation of Automatic Circuit-Breakers, and the Effects of Short Circuits on Dynamos. Bertram Hopkinson. (63) Vol. cli.
- A System of Electric Lighting for Cars. James F. McElroy. (42) Apr.
- Burning of Wooden Pins on High Tension Transmission Lines. C. C. Chesney. (42) Apr.
- Transposition and Relative Location of Power and Telephone Wires. P. M. Lincoln. (42) Apr.
- The Testing of Insulators. F. O. Blackwell. (42) Apr.
- Mechanical Specifications of a Proposed Standard Insulator Pin. Ralph D. Mershon. (42) Apr.
- Methods of Speed Control. William Cooper. (42) Apr.
- Economical and Safe Limits in the Size of Central Stations. H. A. Lardner. (42) May.
- Safety Devices in Central Stations and Substations. Philip Torchio. (42) May.
- Multiple *versus* Independent Operation of Units and Central Stations. Peter Junkersfeld. (42) May.
- The Manufacture of Incandescent Lamps.\* (11) May 8.
- Divided Multiple Switchboards: An Efficient Telephone System for the World's Capitals.\* W. Aitken. (Abstract of paper read before the Inst. of Elec. Engrs.) (26) Serial beginning May 15.
- The Crompton Potentiometer for Electrical Measurements with Direct Current Supply. (19) May 16.
- Long-Distance High-Tension Transmission of Power in California.\* Hamilton Wright. (46) May 16.
- The New Electricity Works at Worcester.\* (26) May 22.
- Recent Development of the Chicago Edison and Commonwealth Electric Systems.\* (27) May 23.

\* Illustrated.

**Electrical—(Continued).**

- Development of Light and Power Business at Red Oak, Iowa.\* (27) May 23.  
 The Pontiac Light and Water Co., Pontiac, Ill.\* (27) May 23.  
 An Automatic Electric Lift.\* (47) May 23.  
 Tests of Electric Driving Equipment in the Works of the Morden Frog & Crossing Co.  
 Miles F. Moore. (13) May 28.  
 Estimates for an Electric Plant for Public Lighting in New York City. (13) May 28.  
 Electric Lighting of Aldershot Camp.\* (26) May 29.  
 Electric Power and Lighting in the New Government Building at San Francisco.\* (14)  
 May 30.  
 Applications of Electricity in Vickers, Sons and Maxim's Works. A. D. Williamson.  
 (Paper read before the Inst. of Elec. Engrs.) (22) Serial beginning May 15; (47)  
 Serial beginning May 30.  
 The 25 000 Volt Transmission Plant of the South Bend Electric Company.\* (27) May 30.  
 Great Electric Installations of Italy: The Hydro-Electric Station of Cenischa.\* Enrico  
 Bignami. (9) June.  
 The Electric Furnace.\* (40) June.  
 The Progress in Wireless Telegraphy. William Maver, Jr. (10) June.  
 Electric Driving in Workshops. A. D. Williamson. (Paper read before the Inst. of  
 Elec. Engrs.) (11) Serial beginning June 5; abstract (47) June 6.  
 Stassano Electric Furnace Steel Process.\* (26) June 5.  
 The Insulation and Mechanical Protection of Electric Wiring. (26) June 5.  
 The Power Plant of the Neversink Light and Power Company.\* (14) June 6.  
 Construction and Operation of a Freight Car Driven by Induction Motors.\* A. B.  
 Weeks. (17) June 6.  
 Railway and Lighting Storage Battery at Milwaukee.\* (17) June 6; (27) June 13.  
 Modern English Power Plant.\* (17) June 6.  
 Relative Advantages of Electrical and Mechanical Methods of Variable Speed Control  
 for General Power Service. William Cooper. (Read before the National Elec.  
 Light Assoc.) (18) June 6.  
 Ashtabula Telephone Exchange.\* (27) June 6.  
 Commutator Losses. W. B. Hird. (Paper read before Glasgow Section, Inst. Elec.  
 Engrs.) (47) June 6.  
 A Small Municipal Water and Electric Light Plant at Tullahoma, Tenn. (13) June 11.  
 The Development of the Current Interrupter. J. Wright. (26) Serial beginning  
 June 12.  
 Rebuilding the Duluth General Electric Company's Station.\* Clifford L. Higgins. (27)  
 June 13.  
 Lifting Electromagnets.\* D. A. Willey. (27) June 13.  
 The Cost of High Tension Lines. (17) June 20.  
 New Central Station of the Commonwealth Electric Company of Chicago.\* (20)  
 June 18.  
 High Tension Transformers. J. W. Farley. (Paper read before Canadian Electrical  
 Assoc.) (62) June 18.  
 The Poplar Electricity Works.\* (26) Serial beginning June 19.  
 Collins Wireless Telephone System.\* T. Byard Collins. (27) June 20.  
 A Contribution to the Subject of Aging of Sheet Steel. Thomas S. Allen. (27)  
 June 20.  
 The Gruhn Telechiograph for Transmission of Handwriting.\* (27) June 20.  
 Loss by Electric Lighting Companies through Poor Meters and Transformers. (13)  
 June 25.  
 The Development of Electric Station Power Plant. Elihu Thomson. (Paper read be-  
 fore National Elec. Light Assoc.) (20) June 25; abstract (13) June 4.  
 Electricity in the Shop. H. M. Phillips. (62) Serial beginning June 25.  
 The New Electricity Works of the Manchester Corporation.\* (20) Serial beginning  
 June 26.  
 Westinghouse Type F Induction Motor.\* (40) June 26; (18) July 25.  
 A Note on Three-Phase Power Measurement. F. A. Fish. (27) June 27.  
 Electric Power from the Hudson.\* Alton D. Adams. (27) June 27.  
 German Tests of the Pupin System of Long Distance Telephony.\* (46) June 27.  
 Applications of Electricity to Agriculture.\* Emile Guarini. (9) July.  
 Electrical Operation in Central Stations.\* Howard W. Leitch. (64) July.  
 High-Pressure Steam Heating Transmission and Electric Lighting Plant at Dresden.\*  
 Franz Köster. (14) July 4.  
 Improvements at the Stephenson Works.\* (17) July 4.  
 The Special Telephone System of the Manhattan Elevated Railway, New York City.\*  
 (27) July 4.  
 An Automatic Telephone Exchange for Chicago.\* R. E. Sack. (27) July 4.  
 Composite System of Electrical Transmission and Distribution. Frederick Bedell.  
 (Paper read before the Cleveland Electric Club.) (27) July 4; (24) July 13.  
 The Telechiograph—A New Facsimile Telegraph.\* (46) July 4.  
 The Rand Central Electric Works.\* (26) July 10.  
 Private Telephone System of the Manhattan Railway Company.\* (17) July 11.  
 Some Recent Effects of Electrolytic Action upon Underground Mains and Other Metals.\*  
 A. A. Knudson. (Paper read before the Amer. Water-Works Assoc.) (24) July 13.  
 The Electric Plant at Tredegar.\* (22) July 17.





**Electrical—(Continued).**

- Continuous and Alternating Currents Applied to Mining. Ellis H. Crapper. (22) July 17.
- Compounded Asynchronous Machinery. G. Hooghwinkel, M. I. E. E. (26) Serial beginning July 17.
- Utica Home Telephone Company's Exchange.\* F. L. Martin. (27) July 18.
- Surveys for Electrolysis and Their Results. D. H. Maury, M. Am. Soc. C. E. (Paper read before Amer. Water-Works Assoc.) (13) July 23.
- On the Preservation of Instruments and Machinery in Bengal. Paul Bruhl. (Paper read before the Calcutta Section of the Inst. of Elec. Engrs.) (12) Serial beginning July 24.
- Hertzian Wave Telegraphy.\* J. A. Fleming. (29) Serial beginning July 24.
- The Batault Electric Wattmeter for Simple Alternating and Polyphase Currents.\* (10) July 25.
- Electrostatic High-Pressure Voltmeter.\* (47) July 25.
- Defective Machine Insulation. C. E. Farrington. (3) Aug.
- Care and Management of Electric Generators.\* Edwin W. Creed. (64) Aug.
- Electric Motors in an Iron Works.\* (14) Aug. 1.
- The Missouri River Power Station of the Metropolitan Street Railway Company, of Kansas City, Mo.\* (17) Aug. 1.
- An Electrically-Operated Coal Hoist.\* Richard Lamb. (27) Aug. 1.
- The Schuckert Electric Works at Nuremberg, Germany.\* S. N. Taylor. (27) Aug. 1.
- The Lodge Muirhead System of Wireless Telegraphy.\* A. Frederick Collins. (27) Aug. 1.
- The Power Plant for the Metropolitan Street Railway of Paris.\* Emile Guarini. (19) Aug. 8.
- Effect of Series Resistance in the Primary Circuit of a Transformer.\* H. A. Pikler. (27) Aug. 8.
- Hydraulic-Electric Development of the Neversink Light and Power Company, Middletown, N. Y.\* (27) Aug. 8.
- Eccentricities of the Static Discharge.\* Walton Harrison. (46) Aug. 8.
- Applications de l'Electricité à la Distribution de la Force Motrice dans les Ateliers et les Diverses Exploitations Industrielles.\* E. De Marchena. (32) May.
- Applications du Rappel Breguet-Rodary aux Communications Télégraphiques et Téléphoniques sur les Chemins de Fer de P.-L.-M.\* Rodary. (38) June.
- Usine Hydro-Electrique de Cauvery Falls (Inde).\* F. Drouin. (33) July 25.

**Marine.**

- Marine Installations for the Carriage of Refrigerated Cargoes.\* R. Balfour. (Paper read before the Inst. of Naval Archts.) (11) May 8.
- H. M. S. *Commonwealth*.\* (12) May 22.
- A Comparison of the German Battleship *Wettin* with the *Maine*.\* Fred. T. Jane. (46) June 13.
- Performance of Babcock & Wilcox Boilers in a Gunboat. Henry C. Dinger. (Reprinted from the *Journal* of the Amer. Soc. of Naval Engrs.) (47) June 20.
- The 120-Ton Floating Derrick for the Norfolk Navy Yard.\* (13) June 25.
- Coaling Warships at Sea.\* Herbert C. Fyfe. (46) June 27.
- The Auxiliary Machinery of Steam Vessels.\* Jasper E. Cooper. (10) Serial beginning July.
- The *Kaiser Wilhelm II*: The Newest and Largest Atlantic Liner.\* Gustav H. Schwab. (10) July.
- On Mercantile Cruisers Fitted with Housing Propellers.\* James Hamilton. (Paper read before the Inst. of Naval Archts.) (11) July 5.
- Channel Steamship *The Queen*. (12) July 3.
- T.—S. S. *Kaiser Wilhelm II*.\* (11) July 10.
- Cross-Channel Steamers. J. H. Biles. (Paper read before the Inst. of Naval Archts.) (11) July 10.
- The Steam Turbine and Its Application to the Propulsion of Vessels.\* C. A. Parsons. (Paper read before the Inst. of Naval Archts.) (11) Serial beginning July 10.
- A 6,000-Ton Floating Depositing Pontoon Dock.\* (46) July 11.
- Fast Coaling Ships for Our Navy.\* E. H. Tennyson D'Eyncourt. (Paper read before the Inst. of Naval Archts.) (11) July 17.
- The Clyde and Naval Work. (12) Serial beginning July 17.
- The New Graving Dock of the Kawasaki Dockyard Company, Kobe.\* (11) July 24.
- The Griffin Marine Type Hydro-Oil Engines.\* (11) July 24.
- The New York Shipbuilding Company's Plant, Camden, N. J.; Pt. II.\* (14) July 25.
- Development in Floating Dry-Docks.\* Joseph J. Shultz. (9) Aug.
- Modern American Launch Motors.\* W. F. Stephens. (10) Aug.
- De l'Emploi des Moteurs à Pétrole à Bord des Bateaux de Pêche.\* J. Pérard. (32). Mar.

**Mechanical.**

- Mechanical Stokers.\* Edwin Fitts. (58) Apr.
- Commercial Gases for Power Purposes. Alexander M. Gow. (58) May.
- Power and Economy of the Gas Engine as Influenced by the Fuel. Wm. P. Flint. (58) May.



**Mechanical—(Continued).**

- Coal-Handling Machinery and Its Application to Steam Power Plants.\* T. F. Webster (58) May 5.
- Utilizing Water Gas in the Production of Illuminating and Heating Gases. William Young. (66) May 5.
- The Construction and Working of Machine Reamers and Reaming Heads.\* (11) Serial beginning May 8.
- The Wilskemp Smoke Consumer.\* (12) May 8.
- Dunlop's Reversible Self Starting Internal Combustion Engines.\* (47) May 9.
- Retort Stoking by Electricity.\* (66) May 12.
- A Small "Home-Made" Dipper Dredge or Steam Shovel.\* (13) May 11.
- A New Pneumatic Hammer.\* (13) May 14.
- Power Plant of the Government Printing Office at Washington.\* (14) Serial beginning May 16.
- A Cold Storage Warehouse.\* (14) May 16.
- The Serpollet Steam Automobile.\* (19) Serial beginning May 16.
- Water in Steam. James Andrew. (Paper read before the Glasgow Technical College Soc.) (47) Serial beginning May 16.
- The Choice of a Steam Boiler. C. E. Stromeyer. (Paper read before the Civil and Mech. Engrs. Soc.) (47) May 16.
- The Dellwik-Fleischer Process of Carburetting Water Gas by Passing It Into Retorts. M. Leconte. (Abstract of paper read before the Société Technique du Gaz en France.) (66) Serial beginning May 19.
- Two Experiments in Smoke Preventing Furnaces.\* (13) May 21.
- Gas-Driven Blowing Engine (Delamere-Deboutteville & Cockerill System).\* (11) May 22.
- Blast Furnace Gas Engines and Steam Engines. (11) May 22.
- Milling Machine Methods.\* (12) May 22.
- The Curtis Steam Turbine.\* (27) May 23; (14) July 11.
- The New Parisian Retort Charging-Machine and Discharging-Ram.\* (66) May 26.
- The Present and Future of the Hastings Gas-Works.\* (60) May 26.
- Reducing Breakage in Coal Shipping.\* (13) May 28.
- Some Present Requirements in Laundry Machinery.\* Henry Waring. (11) May 29.
- Continental Engine Construction. (12) Serial beginning May 29.
- The Expansion, Separation and Compression of Wet Steam. Robert H. Smith. (12) May 29.
- Friction in Gas Engines. H. E. Thompson. (Paper reprinted from the *Proceedings of the Soc. of Mech. Engrs. of Cornell Univ.*) (47) May 30.
- Sulphur-Dioxide and the Binary Engine. R. H. Thurston. (3) June.
- Practical Liquid Air Possibilities for Refrigeration and Power.\* Carl von Linde. (10) June.
- The Equipment of Machine Shops.\* Joseph Horner. (10) June.
- Lignite Burning in Locomotives, Burlington & Missouri River Railroad: Analysis of Smokebox Gases. M. H. Wickhorst. (25) June.
- Group Driving of Machine Tools. J. C. Steen. (25) June.
- Motor Driven Machine Tools: Examples of Individual Drives Applied to Boring Mills.\* (25) June.
- Comparative Tests of California Crude Oils; Atchison, Topeka & Santa Fé Railway. (25) June.
- Power Test of Group Drive Motors: Records of Power Required for the Group Drives at the Roanoke Shops, Norfolk & Western Railway. (25) June.
- The Proportions of Modern Locomotives. Lawford H. Fry. (25) June.
- Fuel: What We Don't Know About It. Edward Atkinson. (28) June.
- Lubricants for Cylinders. R. T. Stroh. (45) June.
- The Bellevue Washery of the D., L. & W. R. R. Co., Scranton, Pa.\* (45) June.
- The Ostergren Oil Engine.\* (64) June; (14) June 6; (46) June 6; (62) June 25.
- Tests of Superheated Steam.\* M. Schroter. (64) June.
- The Condensing Plant of the New York Rapid Transit Power House.\* (64) June.
- Report of the Committee Appointed by the Ohio Gas Light Association to Determine Standard Methods of Testing Fuel Gas Appliances.\* (24) Serial beginning June 1.
- The Heisler Compensating Gear for Direct Acting Pumping Engines.\* (13) June 4.
- A Circular Storage System for 50 000 Tons of Coal.\* (20) June 4.
- Springs and Their Use.\* Ivar Kirkegaard. (20) June 4.
- The Reid Ball Bearings.\* (20) June 4.
- Exhaust-Steam Turbines. (11) June 5.
- Relative Advantages of Electrical and Mechanical Methods of Variable Speed Control for General Power Service. William Cooper. (Read before the National Elec. Light Assoc.) (18) June 6.
- A New Apparatus for Determining the Resistance of Road Vehicles to Traction.\* (46) June 6.
- The Self-Carburetting of Water Gas in Gas-Works. (66) June 9.
- Burning Illinois Coal without Smoke. L. P. Breckenridge, M. Am. Soc. M. E. (Paper read before the Commercial Club of Chicago.) (13) June 11.
- Tests of the Efficiency of Hoisting Tackle. S. L. Woson. (13) June 11.
- Some Tests of Boiler and Furnace Efficiencies.\* A. Bement. (Extract of paper read before National Elec. Light Assoc.) (13) June 11.





**Mechanical—(Continued).**

- The Inefficiency of the Ordinary Lathe for High Speed Cutting. H. M. Norris. (Paper read before the Cincinnati Metal Trades Assoc.) (20) June 11.
- A New Charcoal Cooling Process. Bernhard Zwilling. (20) June 11.
- Comparative Test of Beehive and Retort Coal. E. A. Uehling. (20) June 11.
- The Kynoch-Fordard Oil-Engine.\* (11) June 12.
- Britannia Steel Works, Middlesbrough.\* (11) Serial beginning June 12.
- The Nuremberg Double-Acting Tandem Gas Engines.\* (22) June 12.
- The Bauer Coke Oven.\* (57) June 12.
- The Stress on Bolts in Service. John H. Barr. (Reprinted from Sibley Journal of Engineering.) (47) June 13.
- Maximum Economical Yield of Gas per Pound of Coal Carbonized. John Somerville. (24) June 15.
- Candles and Calories. Vivian B. Lewes. (Lecture delivered before Inst. of Gas Engrs.) (66) June 16.
- Photometry and Testing. Walter Grafton. (Paper read before the Inst. of Gas Engrs.) (66) June 16.
- The Lewes Process at Tipton.\* Sidney O. Stephenson. (66) June 16.
- The "Selas" System of Intensified Gas Lighting by Means of an Admixture of Gas and Air.\* F. D. Marshall. (Paper read before the Inst. of Gas Engrs.) (66) June 16.
- Later Developments in High-Pressure Lighting.\* A. W. Onslow. (Paper read before the Inst. of Gas Engrs.) (66) June 16.
- Molding Machines of the "Squeezer" or Hand Press Type.\* S. H. Stupakoff. (Abstract of paper read before Amer. Foundrymen's Assoc.) (13) June 18.
- Friction and Lubrication. J. Stormouth. (12) June 19.
- Applying a Motor Drive to an Old Lathe.\* (15) June 18.
- Penwyllt Haulage.\* (58) June 19.
- Progress in Machine Tools.\* (18) Serial beginning June 20.
- Butler's 5 000 H.-P. 3-Cylinder Double-Acting Compound Gas Engine.\* (47) June 20.
- Naphthalene. W. H. Birchmore. (Address before Western Gas Assoc.) (24) Serial beginning June 22.
- High-Pressure Gas Incandescent Lighting.\* William Sugg. (Paper read before the Inst. of Gas Engrs.) (66) June 23; (14) June 27.
- The 120-Ton Floating Derrick for the Norfolk Navy Yard.\* (13) June 25.
- The Moore Vertical Water Tube Boiler.\* (20) June 25.
- The New Semet-Solvay Coke Oven.\* (22) June 26.
- The New Shops of the American Locomotive Company at Schenectady.\* Lindsay Duncan. (14) June 27.
- From Siding to Coke Store at the Bury Gas-Works.\* (66) June 30.
- Acetylene Stored and Transported in Safety. John S. Seymour. (3) July.
- Liquid Fuel for Power Purposes. Arthur L. Williston. (9) Serial beginning July.
- The Auxiliary Machinery of Steam Vessels.\* Jasper E. Cooper. (10) Serial beginning July.
- Milling as a Method of Machining; Its Development in American Shop Practice.\* Charles S. Gingrich. (10) July.
- High Pressure Steam Ripping. William Andrews. (Paper read before the Engine Builders' Assoc.) (64) July.
- Graphical Chart for the Solution of Valve Gear Problems. W. F. Durand. (64) July.
- Rope Transmission of Power. D. B. Dixon. (62) July 2.
- The Automobile Congress at Paris. (12) Serial beginning July 3.
- Improvements at the Stephenson Works.\* (17) July 4.
- Warren Rotary Engine.\* (27) July 4; (20) July 9; (14) June 27.
- The Capabilities of High-Speed Steel. Wm. Lodge. (Paper read before Amer. Foundrymen's Assoc.) (47) July 4.
- Heat Conductivity of Gas Retorts.\* H. A. Wheeler. (Paper read before the Western Gas Assoc.) (24) July 6.
- Quadrupling the Capacity of an Ordinary Purifier House at Very Small Cost.\* F. H. Shelton. (Paper read before the Western Gas Assoc.) (24) July 6.
- The Old and the New at Shrewsbury (Gas Works).\* (66) July 7.
- The Buhlmann System of Burning-Off, Shaping, and Seasoning Mantles.\* (66) July 7.
- A New Molding Press for Making Cement Pipe.\* (13) July 9.
- Springs and Spring Steel. William Metcalf. (Paper read before Amer. Soc. for Testing Materials.) (20) July 9; (13) July 30.
- The Manufacture of Armour-Plate Bolts.\* (11) July 10.
- Some New Types of Superheaters.\* W. H. Watkinson. (Paper read before the Inst. of Naval Archts.) (11) July 10; (12) July 17; abstract (47) Serial beginning July 11.
- A New Theory of Heat Power Plants. Robert H. Smith. (12) Serial beginning July 10.
- Automatic Wheel-Cutting Machine.\* (12) July 10.
- An Improved System of Engine Stops.\* (19) July 11.
- Radial Drilling Machines.\* Thomas R. Shaw. (47) Serial beginning July 11.
- Practical Belt Driving. John Tullis. (Abstract of paper read before the Aberdeen Mech. Soc.) (47) July 11.
- A Comparison between the First Cost of Inclined and Horizontal Retorts. Frère. (Paper read before the Société Technique du Gaz.) (66) July 14.
- The Universal Pipe and Fittings.\* (20) July 16.
- Condensing Plant for Central Electric Stations. R. D. Summerfield. (11) Serial beginning July 17.



**Mechanical—(Continued).**

- Cranes on Dover Pier.\* (12) July 17.  
 Steam Autocar Notes.\* (12) July 17.  
 Cylinder Oil and Cylinder Lubrication. Henry M. Wells. (12) Serial beginning July 17.  
 Air and Gas Mixtures, Explosion Pressures, and Cylinder Proportions of Gas Engines. James Dunlop. (47) July 18.  
 Sulphate of Ammonia Making by a New Process.\* J. Ballantyne. (Paper read before the Inst. of Gas Engrs.) (24) July 20.  
 Water Gas Manufacture by the Kramers and Aarts Process. (66) July 21.  
 Portable Pneumatic Revolving Cranes.\* (13) July 23.  
 The Plant of the Hudson Portland Cement Co., at Hudson, N. Y.\* (13) July 23.  
 French Tests of Alcohol Motors. C. C. Longridge, M. I. Mech. E. (12) July 24.  
 Coal Washing and Screening Plants.\* (22) July 24.  
 The Mechanical Plant of a Columbia, S. C., Office Building.\* (14) July 25.  
 The Operation of the Rateau Steam Turbine. (17) July 25.  
 The Inefficiency of the Standard Lathe for High-Speed Cutting. H. M. Norris. (Paper read before Amer. Foundrymen's Assoc.) (18) July 25.  
 The Rateau Steam Turbine.\* (27) July 25.  
 The Management and Working of Boilers.\* Horace Boot. (Abstract of paper read before Incorporated Mun. Elec. Assoc.) (47) July 25.  
 A Machine for Sorting and Washing Pan-Breeze.\* (24) July 27.  
 A German Installation of West's Retort-Stoking Machinery. (66) July 28.  
 Fuel Oil. John F. Rowland, Jr. (3) Aug.  
 The Utilization of Blast-Furnace Gases for Power Purposes. Charles Kirchhoff. (3) Aug.  
 Natural Sources of Energy; the Probable Extensive Development of Solar Power.\* Louis Bell. (10) Aug.  
 Feed-Water Heaters; Examples from Current American Practice.\* William Wallace Christie. (10) Aug.  
 Modern American Launch Motors.\* W. P. Stephens. (10) Aug.  
 Motor-Driven Machine Tools; the Latest Practice in Applying Individual Drives to Shapers.\* (25) Aug.  
 Woodworking Machinery; Important Developments in Individual Driving by Electric Motors.\* (25) Aug.  
 Beehive Coke Ovens.\* (45) Aug.  
 The Reorganization of the Condensing System of the Manhattan Station.\* (64) Aug.  
 Coal and Oil Fuel Compared. George E. Walsh. (64) Aug.  
 The Westinghouse Vertical Marine Type Engine.\* (64) Aug.  
 Burning Powdered Coal Under Boilers.\* (64) Aug.  
 A Small Ice Plant at Columbia, S. C.\* (14) Aug. 1.  
 Improvements in Steam Shovels.\* Waldon Fawcett. (46) Aug. 1.  
 The Ore-Carrying Wire Ropeway at Vivero, Spain.\* (46) Aug. 1.  
 Loss of Illuminating Power of Mantles while Burning.\* Alfred H. White and M. E. Mueller. (Paper read before the Michigan Gas Assoc.) (24) Aug. 3.  
 A New Trench Digging Machine.\* (13) Aug. 6.  
 Metallic Packings; Principles of Design Essential for Successful Development. Charles Longstreth, Assoc. Am. Soc. Naval Engrs. (Reprinted from the *Journal of the Amer. Soc. of Naval Engrs.*, (13) Aug. 6.  
 Note sur les Câbles Témoins: Système F. Arnodin. F. Arnodin. (32) Mar.  
 Moteur à Gaz et à Récupération des Calorifiques Actuellement Perdues. Jules Garnier. (32) Mar.  
 Quelques Progrès Récemment Réalisés dans les Machines à Vapeur.\* P. Arrachart. (32) Apr.  
 Contribution à l'Étude du Fonctionnement Mécanique des Machines Alternatives. R. Lelong. (37) Serial beginning May.  
 Conditions de Résistance des Pistons des Machines à Vapeur. Codron. (37) Serial beginning May.  
 Le Moteur Alterné-Rotatif Primat.\* (36) May 10.  
 Equilibrage des Machines.\* H. Brillié. (33) Serial beginning May 23.  
 La Turbine à Vapeur.\* Raucour. (36) May 25.  
 Les Forces Motrices dans les Régions sans Eau et sans Charbon et en Particulier aux Colonies.\* A. Lombard. (36) May 25.  
 Les Condensations Centrales à l'Exposition de Düsseldorf.\* P. F. Dujardin. (33) May 30.  
 Transport par Hélices à 200 Mètres de Distance.\* (33) May 30.  
 Méthode de Calcul des Arbres Chargés Animés de Grandes Vitesses de Rotation. Delaporte. (37) June.  
 L'Utilisation des Gaz de Hauts Fourneaux. S. Marsolan. (36) June 10.  
 Le Ballon *Lebaudy*.\* G. Espitalier. (33) June 13.  
 Fabrique de Cellulose et de Papier à Rumford Falls (Etats-Unis).\* (33) June 13.  
 Protection contre le Saut de la Navette dans les Métiers à Tisser.\* Henri Marny. (33) Serial beginning June 13.  
 Transmissions de Mouvement par Courroies ou Câbles Enrouleur-Débrayeur du Capitaine Leneveu.\* Ch. Dantin. (33) June 20.  
 Les Nouveaux Appareils d'Éclairage au Gaz par Incandescence.\* H. Guérin. (33) June 27.



**Mechanical—(Continued).**

- Les Turbines à Vapeur.\* A. Abraham. (36) Serial beginning July 10.  
 L'Alcool Considéré Comme Combustible. Edmond Brunet. (36) Serial beginning July 10.  
 L'Acétylène Dissons et Ses Principales Applications.\* A. Janet. (33) July 18.  
 État Actuel de la Théorie de la Surchauffe de la Vapeur. Hermann Bernard. (33) July 25.

**Metallurgical.**

- The Evolution of the Determination of Iron in Ores. Harrison W. Craver. (58) May.  
 The Open-Hearth Process. Leandro Cubillo. (22) May 8.  
 The Application of the Electrical Furnace in Metallurgy.\* Albert Keller. (22) May 8; abstract (47) June 13.  
 The Effect of Flue Dust upon the Thermal Efficiency of Hot Blast Stoves. B. H. Thwaite. (Paper read before the Iron and Steel Inst.) (22) May 8.  
 The Development of the Continuous Open-Hearth Process. Benjamin Talbot. (Paper read before the Iron and Steel Inst.) (22) May 8; (20) May 14; (11) May 15; (68) May 16; (62) June 4; (40) June 27.  
 A New Blast Furnace Top.\* Axel Sahlin. (Paper read before the Iron and Steel Inst.) (22) May 8; (20) May 14; (11) May 29; (47) June 6.  
 The Works and Operations of the North-Eastern Steel Company, Middlesbrough-on-Tees.\* (22) May 15.  
 Electrolytic Zinc Extraction by the Hoepfner Process.\* E. Guenther. (16) May 16.  
 Strength of White-Iron Castings as Influenced by Heat Treatment. A. E. Outerbridge, Jr. (Paper read before Amer. Soc. for Testing Materials.) (13) May 21.  
 The Quality of Pig Iron for Foundry Use as Shown by Fracture and Analysis. S. B. Patterson. (Paper read before the New England Foundrymen's Assoc.) (20) May 21.  
 The Meunre Process for Removing Metallic Obstructions.\* (20) May 21.  
 Smelting at Mt. Lyell, Tasmania.\* (16) May 30.  
 The Works of the Lackawanna Steel Company.\* (14) Serial beginning May 30.  
 Influence of Casting Temperature on Properties of Alloys. Percy Longmuir. (Abstract of paper read before the Iron and Steel Inst.) (47) May 31.  
 Pig-Iron Casting and Conveying Machinery: Its Development in the United States.\* E. A. Uehling. (10) June.  
 The Advantages of Machine-Cast Pig-Iron. Albert Ladd Colby. (10) June.  
 Stassano Electric Furnace Steel Process.\* (26) June 5.  
 A Proposed Process for Extracting Copper from Low-Grade Ores. G. D. Van Arsdale. (16) June 6.  
 Treatment of Low Grade Copper Ores. Edward D. Peters. (16) June 6.  
 Malleable Cast Iron. Richard Moldenke. (Paper read before the Amer. Foundrymen's Assoc.) (20) June 11; (13) June 11; (62) June 25; (22) July 24.  
 Blast Furnace Conditions Affecting the Chemical Composition of Foundry Iron. W. Walley Davis. (Abstract of paper read before the Amer. Foundrymen's Assoc.) (20) June 11.  
 A Point in Concentration. M. A. Knapp. (16) June 20.  
 Cyaniding in Montana. Matt. W. Alderson. (45) July.  
 A Study of Alloys Suitable for Bearing Purposes.\* G. H. Clamer. (3) July.  
 The Physical Properties of Malleable Castings as Influenced by the Process of Manufacture. Richard Moldenke, M. Am. Soc. M. E. (Paper read before Amer. Soc. for Testing Materials.) (13) July 9; (47) July 4.  
 Springs and Spring Steel. William Metcalf. (Paper read before Amer. Soc. for Testing Materials.) (20) July 9; (13) July 30.  
 On Adobe and Other Makeshift Furnaces.\* Henry F. Collins. (Abstract from *Proceedings* of the Inst. of Min. and Metal.) (16) Serial beginning July 11.  
 The Casting of Pipeless Ingots by the Sauveur Overflow Method.\* Albert Sauveur and Jasper Whiting. (Paper read before Amer. Soc. for Testing Materials.) (20) July 16.  
 The Swedish Lancashire Iron. Birger F. Burger. (20) July 16.  
 Note on the Alleged Cementation of Iron by Silicon. J. E. Stead. (Paper read before the Iron and Steel Inst.) (11) July 17.  
 The Cyaniding of Some Silver Ores by Percolation. Andre P. Griffiths and Frank W. Oldfield. (Abstract from *Proceedings* of the Inst. of Min. and Metal.) (16) July 18.  
 New Valves for Regenerative Furnaces.\* (20) July 23.  
 Temperature Reactions in the Blast Furnace. Horace Allen. (12) July 24.  
 The Elmore Oil-Concentration Plant. Arthur W. Sancton. (45) Aug.  
 Fuel Briquetting. (45) Aug.  
 An Introduction to the Study of Alloys.\* Henry M. Howe. (9) Aug.  
 The Treatment of Broken Hill Sulphides. Alec A. Readle. (16) Aug. 8.  
 L'Acier Thomas et Sa Fabrication.\* A. de Riva-Berni. (34) Serial beginning June.  
 Nouvelles Recherches sur les Aciers au Nickel. Léon Guillet. (33) June 27.  
 Affinage de la Fonte par le Procédé Talbot. Nouvelles Applications de ce Procédé. (33) July 4.  
 Fabrication des Essieux en Acier Comprimé.\* (33) July 11.





**Military.**

The Theory and Practice of Armour Attack. (12) July 17.  
Smokeless Powders; Their History and Present Classification. (19) July 25.

**Mining.**

Roads for Mines.\* James W. Abbott. (16) Serial beginning May 16.  
An Automatic Mine Car Trolley.\* (13) May 21.  
Electricity in French Slate Quarries.\* (11) May 22.  
Electric Ore-Finding System. Edward Skewes. (16) May 23.  
Flume Construction.\* W. C. Ralston. (Paper read before the California Miners' Assoc.) (16) May 23.  
Method of Removing Overburden at the New Brothers Home No. 1 Tin Mine, Tasmania.\* James B. Lewis. (16) May 30.  
The Chain and the Pick Machines: A Comparison of the Two Types Coal Cutters from the Standpoint of an Advocate of Chain Machines.\* H. S. Johnson. (45) June.  
Peculiar Mines and Ore Deposits of the Rosita and Silver Cliff Mining District of Colorado.\* A. M. Welles and Arthur Lakes. (45) June.  
Sinking by the Freezing Method and Its Difficulties. (22) June 5.  
On Coal Cutting by Machinery. Owen Hughes. (Paper read before the Manchester Geological and Mining Soc.) (22) June 5; (57) Serial beginning June 12.  
Observations on Gold Deposits. Chester Wells Purington. (16) Serial beginning June 6.  
Methods and Values on the Yukon.\* John D. McGillivray. (16) June 13.  
Test Drilling on the Mesabi Iron Range.\* Kirby Thomas. (16) June 13.  
Electrical Apparatus in Coal Mining. S. B. Belden. (27) June 20.  
Dusty Shots as a Factor in Coal Dust Explosions. Henry S. Munroe. (16) June 27.  
The Gold-Bearing Gravels of Alaska.\* John D. McGillivray. (9) July.  
The Geology of Minnesota. C. W. Hall. (45) July.  
Mining in South Africa. J. H. Curle. (16) Serial beginning July 11.  
The Bottom Levels at Cripple Creek. Geo. J. Bancroft. (16) July 18.  
Gold Pan Mining Plant at Breckenridge, Colo.\* (27) July 18.  
Discovery and History of the Witwatersrand Gold Fields. H. H. Webb. (Abstract of paper read before the South African Assoc. of Engrs.) (68) Serial beginning July 25.  
Transverse Winding Engines for Deep Shafts.\* H. M. Morgans. (Paper read before the Inst. of Min. and Metal.) (68) Serial beginning July 25.  
Prospecting and Valuing Dredging Ground with a Well-Driller at Oroville, Cal. Newton Booth Knox. (Paper read before Inst. of Min. and Metal.) (13) July 30.  
Electric Power Appliances in the Mines of Europe.\* Émile Guarini. (9) Aug.  
Safety Mining Lamps.\* Rufus J. Foster. (3) Aug.  
Water in the Mines of Cripple Creek.\* Victor G. Hills. (16) Aug. 8.  
L'Exploitation des Carrières aux États-Unis. A. De Gennes. (32) Mar.  
Havées Mécaniques Employées dans les Mines de Houille.\* J. Rosset. (33) Serial beginning July 4.

**Miscellaneous.**

Weights and Measures. S. W. Stratton. (58) Mar.  
The Organization of Manufacturing Industries. Andrew Carnegie. (Extracts from Presidential address before Iron and Steel Inst.) (13) May 14; (22) May 8.  
The Rockslide at Frank, Alberta.\* Wm. Pearce. (13) June 4.  
The Effect of Design on Methods of Construction from a Contractor's Point of View. R. W. Newman, Assoc. M. Inst. C. E. (Paper read before the Junior Inst. C. E.) (12) Serial beginning June 5.  
The Training of the Civil Engineer. Geo. F. Swain, M. Am. Soc. C. E. (Extracts from article in *N. Y. Tribune*.) (15) June 12.  
The Cause of the Cementing Value of Rock Powders. Allerton S. Cushman. (Abstract of paper in the *Journal of the Amer. Chem. Soc.*) (14) June 13.  
The Subsidence of the Land and of the Harbor Bottom at Boston. (13) June 18.  
The Making of Specifications. Chas. B. Dudley. (Presidential address delivered before Amer. Soc. for Testing Materials.) (13) July 9; (14) July 18; (20) July 9; (24) Serial beginning July 20.  
The Heppner Disaster. John T. Whistler, Assoc. M. Am. Soc. C. E. (13) July 16.  
Land Subsidence at Boston and the Reliability of Level Datum Planes. (14) July 18.  
Lunette Pyrométrique à Réseau Thermo-Électrique.\* Ch. Féry. (33) May 30.  
Le Laboratoire d'Essais du Conservatoire des Arts et Métiers.\* A. Dumas. (33) July 11.

**Municipal.**

The Construction of a Mountain Road in Cyprus. Edward Hugh Dyneley Nicolls, Assoc. M. Inst. C. E. (63) Vol. cli.  
The Economic Construction and Maintenance of Roads in the Island of Cyprus. Charles Vincent Bellamy, M. Inst. C. E. (63) Vol. cli.  
Asphalt Pavement and Street Railway Tracks.\* W. Boardman Reed. (17) May 23.  
The High Pressure Gas Main under the Mississippi River at New Orleans.\* Thomas D. Miller. (Paper read before the Western Gas Assoc.) (24) June 8.  
Brick Paving in Iowa. (14) June 13.



**Municipal—(Continued).**

- Cost of Brick Pavements in Champaign, Ill. Charles Apple. (Reprinted from *The Technograph*.) (13) June 18.  
 Improved Streets and Their Repairs. W. F. Raymond. (60) July.  
 Concrete Culverts. A. W. Campbell. (Paper read before the Eng. Soc. of the Toronto School of Practical Science.) (67) July.  
 Sidewalk Building and Sidewalk Grades in Small Towns. Ernest McCullough. (13) July 9.  
 The Testing of Bitumens for Paving Purposes. A. W. Dow. (Abstract of paper read before the Amer. Soc. for Testing Materials.) (14) July 11; (13) July 23.  
 Notes on Some Moderate Cost Roads.\* William G. Raymond. (14) July 18.  
 The United States Road Material Laboratory.\* Logan Waller Page and Allerton S. Cushman. (Paper read before the Amer. Soc. for Testing Materials.) (14) Serial beginning July 25.  
 The Back Filling of Trenches. W. F. Raymond. (60) Aug.  
 The Grand Boulevard and Concourse, New York City.\* (14) Aug. 8.  
 Question d'Édilité Parisienne.\* Ch. de Tavernier. (36) July 10.

**Railroad.**

- The Limmatt Valley Electric Road Railway. Charles Sheibner du Riche Preller, Assoc. M. Inst. C. E. (63) Vol. cli.  
 Railroad Repair Shop Design and Equipment.\* George A. Damon. (61) Apr.  
 The Use of Timber by Railroads and Its Relation to Forestry. Hermann von Schrenk. (65) Apr.  
 Railroad Interest in Forest Supplies. B. E. Fernow. (65) Apr.  
 Injectors as They Are Met With in Every Day Railway Practice. F. W. Edwards. (61) May.  
 Express Engine, Western Railway of France.\* (12) May 15.  
 Suburban Locomotive Development.\* (15) May 15.  
 Metal Ties in Germany.\* (15) May 15.  
 A New Electric-Motor Signal.\* (15) May 15.  
 Water for Locomotive Boilers. William M. Jewell. (15) May 15.  
 The Appleyard Syndicate's Interurban System.\* (17) Serial beginning May 16.  
 Tandem Compound for the New York Central.\* (40) May 15.  
 New DeWitt Roundhouse of N. Y. C. & H. R. R. R.\* (18) May 16.  
 Valtellina 20 000 Volt Three-Phase Electric Railway in Italy.\* (18) May 16.  
 The Electrification of the Mersey Railway.\* (47) May 16.  
 Location and Construction of the Ohio Residency, Pittsburg, Carnegie & Western R. R.\* (13) May 21.  
 A New Automatic Buffer Coupling.\* Charles Rous-Marten. (12) May 22.  
 The Sonder Steel Coke Car.\* (40) May 22.  
 Temperature Tests of Injected Water (Locomotives).\* H. M. Wickhorst. (40) May 22.  
 Switching Locomotives, Pittsburg, Shawmut & Northern Railroad.\* (40) May 22.  
 New Passenger Locomotives for the Chicago & Alton Ry.\* (13) May 28.  
 The Valtellina Electric Railway. Émile Guarini. (40) May 29.  
 Steam Distribution of the Vauclain Compound Locomotive.\* Lawford H. Fry. (From the Baldwin Locomotive Works' "Record of Recent Construction," No. 42.) (15) May 29.  
 The Three-Phase Railway at Valtellina.\* (17) May 30.  
 The Proposed Terminal at St. George, Staten Island.\* (17) May 30.  
 Six-Coupled Bogie-Express Engine (Class 4-6-0); Great Western Railway.\* (21) June.  
 Leaky Flues and Circulation in Wide Firebox Locomotives. John Player. (25) June.  
 Lignite Burning in Locomotives, Burlington & Missouri River Railroad: Analysis of Smokebox Gases. M. H. Wickhorst. (25) June.  
 Steel Frame, Side-Door, Suburban Passenger Cars; Illinois Central Railroad.\* (25) June.  
 Steel Frames for Cars: A Steel Frame Box Car.\* C. A. Seley. (25) June.  
 Compound Passenger Locomotives, 4-4-2 Type; Vauclain Four-Cylinder Balanced System, Atchison, Topeka & Santa Fé Railway.\* (25) June.  
 Steel Underframes and Steel Cars. (25) June.  
 New Roundhouse of the Baltimore & Ohio Railway.\* (39) June.  
 Freight Locomotives of the Kansas City Southern Railway.\* (39) June.  
 Line Changes on the Rio Grande Western Ry. in Utah.\* W. P. Hardesty. (13) June 4.  
 Electro-Pneumatic Interlocking Plant. (11) June 5.  
 Clayton's Fog-Signalling Apparatus.\* (11) June 5.  
 Eight-Wheeled Coupled Compound Locomotive for the Mediterranean Railway Company, Italy.\* (11) June 5.  
 The Hall Electro Gas Signal.\* (15) June 5.  
 Electrical Installation for Suburban Traffic on the North Eastern.\* (15) June 5.  
 Superheated Steam in Locomotive Service. (15) Serial beginning June 5.  
 Compound Consolidation Locomotive for the Southern Pacific.\* (40) June 5.  
 Maintenance of Boilers and Roundhouse Work. Reynold C. Young. (Presented in Columbus Convention, International Ry. Master Boilermakers' Assoc.) (18) June 6.  
 New Electric Railroad from Paris to Versailles.\* (19) June 6.  
 Gillmor's Automatic Switch Lock.\* (15) June 12.  
 Steel Tandem and Twin Spring Draft Gears.\* (15) June 12.





**Railroad—(Continued).**

- The Forsyth Automatic Air and Steam Coupling.\* (15) June 12.  
 Heavy Eight-Wheel Passenger Engines for the Delaware.\* (40) June 12.  
 Electric Locking for Lovers of Interlocking Machines.\* (40) June 12.  
 The Lackawanna & Wyoming Valley Railroad.\* (14) June 13; (40) June 19.  
 Electric Interurban for Freight and Passengers (Lackawanna & Wyoming Valley).\* (17) June 13.  
 The Electric Lighting of a Few Steam Trains of the Prussian Railroads.\* (18) June 13.  
 The Standard Code on the C., N. O. & T. P.\* (15) June 19.  
 Tendencies in Locomotive Design.\* (15) June 19.  
 Trucks for High Speed Electric Railroads.\* (15) June 19.  
 A Remarkable Iowa Interurban.\* (17) June 20.  
 Electrical Traction on the North-Eastern Railway of England.\* (17) June 20; (12) July 24.  
 Pennsylvania R. R. Standard Passenger Locomotives.\* (18) June 20.  
 New St. Paul Shops of Great Northern Railway.\* (18) June 20; (15) June 19.  
 The Perfect Contact System of Electric Traction.\* (47) June 20.  
 German Tests of Railway Train Resistance.\* (13) June 25.  
 New York Central Passenger Locomotive.\* (11) June 25.  
 Milwaukee Shop Improvements of the Chicago, Milwaukee & St. Paul.\* (15) June 26.  
 The Internal Combustion Engine in Railroad Service. (Abstract of paper presented to the Master Mechanics' Convention.) (15) June 26; (18) June 27; (25) Aug.; (62) Aug. 6.  
 The Symington Dust Guard.\* (15) June 26.  
 Modern Steel Cars.\* (15) June 26.  
 Steel Coke Cars for the Pennsylvania Lines West.\* (15) June 26.  
 Fast Freight Engines for the Lackawanna.\* (40) June 26.  
 Improvements on the Cleveland & Southwestern Interurban System.\* (17) June 27.  
 English Interurban Line (Portsmouth to Horndean).\* (17) June 27.  
 New Weed-Burning Cars, C., M. & St. P. Ry.\* (18) June 27.  
 Chicago, Milwaukee & St. Paul Improvements at West Milwaukee, Wis.\* (18) June 27.  
 The Schoen Solid Forged and Rolled Steel Wheel.\* (18) June 27.  
 The Automobile and the Railway as Transport Agents. Sylvester Stewart. (9) July.  
 The Design of Permanent Way and Locomotives for High Speeds. J. C. Inglis, M. Inst. C. E. (Read at the Engineering Conference, London.) (21) July.  
 15-Ton Bogie Fish Wagons: Great Central Ry.\* (21) July.  
 The Van Dyke Tank Wagon.\* (21) July.  
 Siemens' Electric Governing Gear for Pneumatic Brakes.\* (21) July.  
 Express Passenger Engine "Atlantic Class": Great Northern Railway.\* (21) July.  
 Boiler with Belpaire Fire-Box and Coned Barrel: Great Western Railway.\* (21) July.  
 American Railway Master Mechanics Association: Abstracts of Committee Reports.\* (39) July.  
 Master Car Builders' Association: Abstracts of Committee Reports. (39) July.  
 The Rolling and Structure of Steel Rails. P. H. Dudley. (Report to W. J. Wilgus, Fifth Vice-President, N. Y. C. & H. R. R. R.) (62) Serial beginning July 2.  
 Heavy Special Type Passenger Locomotive.\* (12) July 3.  
 The Norfolk & Western Railroad.\* Geo. L. Fowler. (15) Serial beginning July 3.  
 The Seasoning of Tie Timber.\* Hermann von Schrenk. (Bureau of Forestry Bulletin.) (15) Serial beginning July 3.  
 Boston & Maine's Latest Passenger Equipment.\* (40) July 3.  
 Automatic Signal Protection for Milwaukee Passenger Station, Chicago, Milwaukee & St. Paul Railway.\* (40) July 3.  
 Methods for Winter Railway Location and Construction.\* E. H. Drury. (14) July 4.  
 The Electrification of British Railways.\* (17) July 4.  
 Recent Improvements in Boiler Design.\* (Abstract of report of Committee to Ry. Master Mechanics' Assoc.) (18) July 4; (47) July 18.  
 Steam and Air Line Connections. (Report of Committee to Master Car Builders' Assoc.) (18) July 4.  
 Standard Requirements for High-Speed Foundation Brake Gear for Passenger Service.\* (Report of Committee to Master Car Builders' Assoc.) (18) July 4; (25) Aug.  
 Consolidation Locomotive for Southern Railway.\* (18) July 4.  
 Collarless Journals. (Report of Committee to Master Car Builders' Assoc.) (18) July 4.  
 Government Ownership of Railways. H. R. Meyer. (40) Serial beginning July 10.  
 Ten-Wheel Compound Locomotive for the Chicago & Eastern Illinois.\* (40) July 10.  
 Tank Cars.\* (Report of Committee of Master Car Builders' Assoc.) (40) July 10.  
 Report of Committee to Master Mechanics' Assoc.: Piston Valves. (18) July 11.  
 Locomotive Front Ends. (Report of Committee to Master Mechanics' Assoc.) (18) July 11.  
 Results Observed upon the Philadelphia & Reading Ry. in Connection with Inspection of Steel Rails.\* Robert Job. (Paper read before Amer. Soc. for Testing Materials.) (13) July 16; (20) July 16.  
 The "Crewe" System of Electrically-Operated Points and Signals.\* (11) July 17.  
 McBride's Locomotive Feed Water Heater.\* (15) July 17.  
 The Cutting and Laying of Ties.\* Hermann von Schrenk. (15) July 17.  
 The Electric Railways on Long Island.\* (17) July 18.



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- The System of the Northern Texas Traction Company.\* (17) July 18.  
 The New La Salle Street Station in Chicago.\* (18) July 18.  
 Foundation Brake Rigging. Henry Kolseth. (Paper read before New England R. R. Club.) (15) July 24.  
 Electro-Pneumatic Interlocking at Solvay, N. Y.\* (40) July 24.  
 The Hudson River Tunnel.\* (14) July 25.  
 The First Third Rail Road in Switzerland.\* Henri Somach. (17) July 25.  
 Operation of Electric Cars in Cripple Creek District.\* (17) July 25.  
 The Rebuilding of the Gulf & Ship Island.\* (15) July 31.  
 Atlantic Type (4-4-2) Locomotive for the Baltimore & Ohio.\* (15) July 31.  
 Progress of the Atlantic Avenue Improvement of the Long Island Railroad.\* (15) July 31.  
 Atlantic Avenue Improvement on the Long Island Railroad.\* (40) July 31.  
 The Wellman-Street Fifty-Ton Steel Hopper Car.\* (40) July 31; (18) Aug. 1.  
 Storage Batteries on Electric Railways. Howard S. Knowlton. (6) Aug.  
 Specifications for Locomotive Axles and Forgings.\* (Abstract of Report of Committee, Master Mechanics' Assoc.) (25) Aug.; (18) Aug. 1.  
 Cast-Iron Wheels.\* (Abstract of Report of Committee, Master Car Builders' Assoc.) (25) Aug.  
 Culm Burning Passenger Locomotives; 4-6-0 Type; Delaware & Hudson Company.\* (25) Aug.  
 The Main Shops of the American Locomotive Company at Schenectady.\* (14) Aug. 1.  
 Denver & Northwestern Interurban Road for Hauling Coal.\* (17) Aug. 1.  
 Electric Interurban between Columbus and Zanesville.\* (17) Aug. 1.  
 Experiments with Steel and Reinforced Concrete Ties.\* (18) Aug. 1.  
 Side Bearings and Center Plates.\* (Abstract of Report of Master Car Builders' Committee.) (18) Aug. 1.  
 Train Lighting with Steam Turbines.\* Geheimrath Wichert. (10) Aug. 1.  
 The Milan-Gallarate Electric Railway.\* P. Letheule. (27) Aug. 1.  
 New Terminal Station at Chicago for the C., R. I. & P. Ry. and the L. S. & M. S. Ry.\* (13) Aug. 6.  
 Stremmatograph Tests of Fiber Strains in Rails under Moving Locomotives. P. H. Dudley, M. Inst. Min. Engrs. (Paper read before the Amer. Soc. for Testing Materials.) (13) Aug. 6; (40) July 24.  
 Plotting of Speed Time and Speed Distance Curves from the Acceleration Speed Curve.\* L. A. Freudenberger. (27) Aug. 8.  
 Frein-Electro-Magnétique "Westinghouse."\* George Lesourd. (32) May.  
 Éclairage des Voitures de Chemins de Fer au Moyen de l'Incandescence per le Gaz.\* H. Giraud and G. Maucière. (38) May.  
 Expériences sur le Rendement des Locomotives.\* Joseph Nadal. (38) May.  
 Traction Electrique dans le Tunnel de la Mersey; Chemin de Fer de Liverpool à Birkenhead.\* Ch. Dantin. (33) May 16.  
 Création d'une Nouvelle Gare Centrale de Triage à Chicago.\* (38) June.  
 Note sur les Postes Électriques (Système Taylor) de la Gare de Pétange (Grand Duché de Luxembourg)\* Collot. (38) June.  
 Nouvelle Locomotive de Banlieue du "Great Eastern Railway."\* R. Bounin. (36) June 25.  
 Chemin de Fer Électrique de Fribourg-Morat-Anet (Suisse)\* H. Somach. (33) June 27.  
 Types Récents de Voitures des Chemins de Fer et Tramways Autrichiens.\* A. Morizot. (34) July.  
 Essais de Pièces de Locomotives en Acier Moulé par la Compagnie du Chemin de Fer du Nord. M. Du Bousquet. (38) July.  
 Voitures Automotrices à Vapeur (Système V. Purrey) Construites pour la Compagnie Paris-Lyon-Méditerranée.\* J. Tête. (38) July.

**Railroad, Street.**

- Electric Tramways. Charles Hopkinson, M. Inst. C. E., Bertram Hopkinson and Ernest Talbot, M. Inst. C. E. (63) Vol. cli.  
 A System of Electric Lighting for Cars. James F. McElroy. (42) Apr.  
 The Transportation Problem of Greater New York. W. W. Wheatly. (65) May.  
 Progress in British Tramways. (11) May 8.  
 The London County Council Electric Tramways: The Construction and Equipment of the Westminster-Tooting Section.\* (26) May 15; (12) May 15.  
 Recent Developments in High-Speed Electric Traction in Germany.\* (17) May 16.  
 The Mersey Electric Railway.\* (26) May 22.  
 General Electric Company's Surface Contact System.\* (11) May 29.  
 Mechanical Traction on Tramways.\* (10) May 30.  
 New Automatic Fender and Wheel Guard. (46) May 30.  
 Foundations for the Elevated Structure of the Boston Elevated Railway.\* Geo. A. Kimball. (1) June.  
 Notes on European Tramways.\* Richard McCulloch. (4) June.  
 An Interesting Example of Wide Arch Soft Ground Tunneling (Boston Subway Extension)\* (13) June 4.  
 London United Tramways Power Station.\* (12) June 5.



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- The Electrification of the Underground (London).\* Wilfred Yorke. (26) June 5.  
 Section 4, New York Rapid Transit R. R.\* (14) Serial beginning June 6.  
 Recent Additions to the Generating Plant of the Montreal Street Railway.\* Ralph D. Mershon. (17) June 6.  
 Fifty-Second Avenue Terminal in Chicago.\* (17) June 6.  
 Conduit System of the London County Council.\* (17) June 6.  
 London Conduit Railway System.\* (27) June 13.  
 Hampshire Light Railways.\* (26) June 19.  
 The Electrical Conductivity of Copper. Rollo Appleyard, A. M. Inst. C. E. (26) Serial beginning June 19.  
 M. C. B. Truck for Brooklyn Elevated Railway.\* (17) June 20.  
 The 4000-Horse Power Engines at the Third Avenue Brooklyn Power House.\* (64) July.  
 Open Elevated Motor Car—Brooklyn Heights Railroad.\* (15) July 3.  
 Notes on Sub-Station Practice. (17) July 4.  
 Transportation Facilities at the Soo.\* (17) July 4.  
 Emergency Car and Other Wrinkles on the Orange & Passaic Valley Railway.\* (17) July 4.  
 An Emergency Track Brake used by the United Railroads of San Francisco.\* (17) July 4.  
 The Proposed Brooklyn Bridge Terminal and New York Municipal Building.\* (13) July 9.  
 The Paris Metropolitan Railway.\* (12) Serial beginning July 10.  
 Notes on the Des Moines City Railway.\* (17) July 11.  
 Proposed Inner Circle System for Chicago.\* (17) July 11.  
 Private Telephone System of the Manhattan Railway Company.\* (17) July 11.  
 Station Indicators for Subway, Elevated and Other Railway Systems.\* Ernest K. Adams. (27) July 11.  
 Power Station for the Underground Electric Railways Company of London.\* (17) July 18.  
 Elevated Railways.\* Gerald Barker. (11) July 24.  
 Power Brakes in St. Louis. R. P. Garrett. (15) July 24.  
 Milford Street Railway System.\* (17) July 25.  
 Ventilating Railway Motors.\* (17) July 25.  
 The Reorganization of the Condensing System of the Manhattan Station.\* (64) Aug.  
 The Missouri River Power Station of the Metropolitan Street Railway Company, of Kansas City, Mo.\* (17) Aug. 1.  
 Tramway Conditions in America and Great Britain Compared. Chris. J. Spencer. (17) Aug. 1.  
 Permanent Way Construction and Maintenance. Charles A. King. (17) Aug. 1.  
 Erection of Manhattan Valley Viaduct.\* (14) Aug. 8; (20) July 30.  
 The Power Plant for the Metropolitan Street Railway of Paris.\* Émile Guarini. (19) Aug. 8.  
 Traction Électrique: Prise de Courant par Contact Superficiel: Système Paul.\* René Philippe. (34) May.  
 Le Chemin de Fer Suspendu de Barmen-Elberfeld-Vohwinkel. René Philippe. (35) Serial beginning May.  
 Étude Générale sur le Chemin de Fer Métropolitain de Paris. (36) Serial beginning May 25.

**Sanitary.**

- Portslade and Southwick Drainage, 1902: Intercepting Sewer and Outfall. George Stow, Assoc. M. Inst. C. E. (63) Vol. cli.  
 Red River Valley Drainage Ditches: Their Repair and Maintenance.\* W. R. Hoag. (1) Apr.  
 The Action of the Septic Tank on Acid Iron Sewage. (14) May 16.  
 An Investigation of a Garbage Crematory. (Extract from a report by Rudolph Hering to the Special Committee on Crematory of the City Council of Trenton, N. J.) (19) Serial beginning May 16.  
 Swampscott Sewerage System.\* (14) May 23.  
 The Chicago Intercepting Sewer System.\* (13) May 28.  
 A Difficult Sewer Crossing Under an Old Aqueduct in Brooklyn.\* (14) May 30.  
 Water Supply in the Mutual Life Insurance Building, New York.\* (14) May 30.  
 The Composition of Sewage in Relation to Problems of Disposal. George W. Fuller. (7) June.  
 Power and Pumping Stations of the New Orleans Drainage System.\* William Mayo Venable. (9) June.  
 The Baynes Garbage Disposal Works at Buffalo. (14) June 6.  
 The Garbage Reduction Plant at Baltimore.\* (14) June 13.  
 American Blower Company's New Office Building: Heating and Ventilating System.\* (20) June 25; (15) July 17; (40) July 24; (14) July 25; (25) Aug.  
 High Pressure Steam Heating Transmission and Electric Lighting Plant at Dresden.\* Franz Köster. (14) July 4.  
 The Northwestern Ave. Sewer at Indianapolis, Ind.\* W. Buehler. (13) July 16.  
 An Improved Steam-Heating System.\* (13) July 23.

\* Illustrated.





**Sanitary—(Continued).**

- On the Distribution of Sewage on Bacteria Beds. John C. Thresh and Martin Priest. (Abstract of paper read before Inst. of San. Engrs.) (12) July 24.  
 Concrete Sewer at Coldwater, Mich. (14) July 25.  
 Air Heating with Radiators and a Closed Piping System. (13) July 30.  
 Commission Chargée de l'Étude des Questions Relatives à la Pollution des Cours d'Eau: Mission en Angleterre: Rapport de la Sous-Commission. (Belgium). (30) June.  
 Assainissement des Villes. (36) Serial beginning July 10.  
 La Balayuse Automatique Anti Microbienne et l'Incinération des Ordures à New York.\* Albert Reyner. (36) July 10.

**Structural.**

- Concrete. Acheson Smith. (58) Apr.  
 Cement: Its Manufacture, What It Is, and How to Test It. Armin Schotte. (58) Apr.  
 Water Tightness in Concrete. Thos. P. Roberts. (58) Apr.  
 A Reinforced Concrete Floor Used in the Youngstown Car Barn. G. M. Scofield. (58) Apr.  
 Ferro-Concrete Warehouse at Newcastle-on-Tyne.\* (67) May.  
 Portland Cement Manufactured from Blast Furnace Slag. C. de Schwarz. (Paper read before the Iron and Steel Inst.) (22) May 8; (57) May 15; (28) May 28; (12) May 22; (62) June 4.  
 Structural Details of the Medical Buildings, Cornell University.\* (14) May 16.  
 A New System of Finishing Concrete Structures.\* (13) May 21.  
 Paint as a Preservative of Iron from Rust. (12) May 22.  
 A Tall Concrete-Steel Office Building.\* (14) May 23.  
 Grillage vs. Concrete Foundations. J. C. Hain. (18) May 23.  
 Sand Cement for Concrete Works Remote from Transportation Lines. (Abstract from Bulletin No. 213, U. S. Geological Survey.) Edward Duryee. (13) May 28.  
 A New Cressoting Process. Hermann von Schrenk. (15) May 29.  
 Boston Foundations. Joseph R. Worcester. (1) June.  
 Foundations. George B. Francis. (1) June.  
 Specifications for Material and Workmanship for Steel Structures.\* T. L. Condon. (4) June.  
 Timber and Composite Roofs.\* (21) Serial beginning June.  
 Self-Supporting Steel Stacks. R. E. Newton, Assoc. M. Am. Soc. C. E. (14) June 6.  
 The Bi-Centennial Memorial Buildings of Yale University.\* (14) June 6.  
 The Aiken Improved Roof Construction for Manufacturing Plants.\* (20) June 11.  
 The Testing of Building Stone. Edwin C. Eckel. (16) June 20.  
 The British Fire Prevention Committee and Its Work. (10) June 20.  
 The New Shops of the American Locomotive Company at Schenectady.\* Lindsay Duncan. (14) June 27.  
 The Use of Iron Pipe in Structural Work.\* Egbert P. Watson. (9) July.  
 Portland Cement Manufacture: The Raw Materials. Edwin C. Eckel. (60) July.  
 The Proposed Brooklyn Bridge Terminal and New York Municipal Building.\* (13) July 9.  
 The Works of the St. Louis Portland Cement Company, Prospect Hill, Mo.\* John E. Conzelman. (14) July 11.  
 A Standard Method for the Analysis of Cement. (13) July 16.  
 The Relative Strength of Wet and Dry Concrete. James W. Sussex. (Reprinted from the *Technograph*.) (13) July 16.  
 A Table for Pitch and Efficiency of Riveted Joints. Philip B. Hill. (13) July 16.  
 The Erection of a Tall Concrete Office Building (Ingalls Bldg., Cincinnati).\* (14) July 18.  
 The Steel Manufacturers' Standard Specifications. Albert Ladd Colby. (Abstract of paper read before the Amer. Soc. for Testing Materials.) (14) July 18; (62) Serial beginning Aug. 6.  
 The Plant of the Hudson Portland Cement Co., at Hudson, N. Y.\* (13) July 23.  
 Soundness Tests of Portland Cement.\* W. P. Taylor, Jun. Am. Soc. C. E. (Paper read before Cement Section, Amer. Soc. for Testing Materials.) (13) July 23.  
 International Fire-Prevention Congress. (11) July 24.  
 The New York Shipbuilding Company's Plant, Camden, N. J.; Pt. II.\* (14) July 25.  
 American Blower Company's New Office Building.\* (14) July 25.  
 Sixteen-Story Concrete-Steel Office Building at Cincinnati, O.\* (13) July 30.  
 The Strength of Concrete as Affected by Different Percentages of Water. T. L. Doyle and E. R. Justice. (13) July 30.  
 Tests of Portland Cement Mortar Exposed to Cold. C. S. Gowen, M. Am. Soc. C. E. (Paper read before Amer. Soc. for Testing Materials.) (13) July 30.  
 Rational Formulas for the Strength of a Concrete-Steel Beam. S. E. Slocum. (13) July 30.  
 Rivets in Structural Steel Work.\* C. J. Tilden, Assoc. M. Am. Soc. C. E. (Reprinted from *Harvard Engineering Journal*.) (13) July 30.  
 The Main Shops of the American Locomotive Company at Schenectady.\* (14) Aug. 1.  
 Effect of Water and Combinations of Sand on the Setting and Strength of Cement. E. S. Larned. (Abstract of paper read before the Amer. Soc. for Testing Materials.) (13) Aug. 6.

\* Illustrated.



**Structural—(Continued).**

- The Cause of the Cementing Value of Rock Powders and the Plasticity of Clays. Allen S. Cushman. Abstract of paper read before the Amer. Soc. for Advancement of Science. (13) Aug. 6.
- Preservation of Wood. (Translated from *La Chronique Industrielle*.) (19) Aug. 8.
- Note sur les Câbles Témoins: Système F. Arnodin. F. Arnodin. (32) Mar.
- Les Sables Bouillants: Méthodes Nouvelles de Constructions dans les Terrains Aquifères. A. Casse. (30) June.
- Essai d'une Théorie des Voûtes d'Égale Résistance. Maurice Astier. (35) Serial beginning June.
- La Nouvelle Caserne de Sapeurs-Pompiers de la rue Carpeaux.\* M. Marchand. (33) June 6.
- Le Nouveau Pavillon du Pesage de l'Hippodrome de Longchamp.\* Couraud. (36) June 10.
- La Méthode Chartée pour l'Essai au Choc des Aciers Laminés.\* Léon Griveaud. (34) July.
- Pavillon de Chirurgie à l'Asile Clinique Sainte-Anne, rue d'Alésia, à Paris.\* Ed. Perrotte. (35) July.
- Fabrique de Ciment Portland de Rudelsbourg (Saxe).\* (35) July.
- Les Bains Publiques Karl Müller à Munich.\* (33) July 18.

**Topographical.**

- The Construction of Maps and Charts.\* G. J. Morrison. (29) May 8.
- The New Coast and Geodetic Survey Precise Level; a Possible Successor of the Wye Level.\* John F. Hayford. (13) July 2.
- Base Line Measurement at West Point.\* Joseph E. Kuhn. (14) July 25.
- A Graphical Method of Setting Slope Stakes. J. M. Rudiger. (13) July 30.
- The Magnetic Observatories of the United States Coast and Geodetic Survey in Operation on July 1, 1902.\* L. A. Bauer and J. A. Fleming. (19) Aug. 8.

**Water Supply.**

- Wrought-Steel Conduits for Gravitation and Pressure Water-Supply. Herbert Fetherston Lloyd. (63) Vol. cli.
- A Comparison of Three Methods of Estimating Quantities of Soil Stripping from Water Supply Reservoirs. (1) Apr.
- Method of Estimating Quantities of Soil Excavation from Wachusett Reservoir.\* Charles A. Bowman. (1) Apr.
- St. Louis Water Supply. R. E. McMath. (1) May.
- The Center Square Water-Works of Philadelphia; The Source of Water Supply from 1891 to 1815.\* (13) May 11.
- The Utilization of Utah Lake as a Reservoir.\* W. P. Hardesty. (13) May 21.
- A Gas Engine Pumping Station.\* (14) May 23.
- Construction Work for a Water Power Plant near Danville, Va.\* (14) May 30.
- Tests with a Pelton Wheel. Wm. Campbell Houston. (Paper read before the Inst. of Engrs. and Shipbuilders in Scotland.) (47) Serial beginning May 30.
- Hydraulic Developments as Related to Electric Installations.\* Wm. B. Jackson. (4) June.
- Report of Tests of Three New Pumps for Chicago Water Works, Made in 1902.\* (4) June.
- Great Electric Installations of Italy: The Hydro-Electric Station of Cenischia.\* Enrico Bignami. (9) June.
- Pipe and Pipe Laying for the Metropolitan Water-Works.\* Caleb Mills Saville. (28) June.
- The Echo Lake Dam, at Milford, Mass.\* Leonard Metcalf. (28) June.
- The Water Supply of New Orleans and Its Improvement.\* Robert Spurr Weston. (28) June.
- A Little Talk about Water Rates. John C. Chase. (28) June.
- Underground Water: Suggestions on How to Obtain and Care for It. George Bowers. (28) June.
- How I Reduce Pressure on a Gravity System.\* E. H. Gowing. (28) June.
- Automatic Drop Shutters for the Betna Irrigation Dam, India.\* Herbert M. Wilson, M. Am. Soc. C. E. (13) June 4.
- The Heiser Compensating Gear for Direct Acting Pumping Engines.\* (13) June 4.
- Water Purification Experiments at New Orleans. (14) June 6.
- Instructions to Inspectors of Cast-Iron Water Pipe, Special Castings and Stop Valves. Philadelphia. (13) June 11; (14) May 23.
- A Small Municipal Water and Electric Light Plant at Tullahoma, Tenn. (13) June 11.
- The Spier Falls Dam of the Hudson River Water-Power Company.\* (13) June 18.
- The Bruun-Lowener Water Softener.\* (47) June 13.
- The Goss Series Distilling Apparatus\* Charles Ducas. (15) June 19.
- The Detroit Water-Works: A Short History.\* Clarence W. Hubbell, Assoc. M. Am. Soc. C. E. (14) June 20.
- Management of Pumping Stations. Kenneth Torrance, M. Am. Soc. M. E. (14) June 20.

\* Illustrated.





**Water Supply—(Continued).**

- A Very Tall Steel Water Tower.\* (14) June 20.  
 Past and Present Pumping Methods in the Metropolitan Water District of Massachusetts. A. O. Doane. (14) June 20.  
 Progress of the Construction of the New Croton Dam.\* (14) June 20.  
 On the Design and Construction of Slow-Sand Filters. John H. Gregory, M. Am. Soc. C. E. (14) June 20.  
 Hydraulic Diagrams and Further Notes upon the Hazen-Williams Slide Rule.\* Leonard Metcalf, M. Am. Soc. C. E. (14) June 20.  
 Raising Two Lines of 36-Inch Pipes at the Mystic River, Somerville, Mass. John L. Howard. (14) June 20.  
 The Spier Falls Dam and Power Plant of the Hudson River Water Power Company.\* George E. Howe. (14) June 27.  
 Electric Power from the Hudson.\* Alton D. Adams. (27) June 27.  
 Four Systems of Softening Water for Industrial Purposes.\* (13) July 2.  
 Notes on Progress of Cincinnati's New Water Works.\* C. N. Miller. (14) July 1.  
 The Great Goose Creek Dam for the Denver Water Supply.\* (46) July 1.  
 The Harris-Anderson Water Softener. (11) July 10.  
 Some Recent Effects of Electrolytic Action upon Underground Mains and Other Metals.\* A. A. Knudson. (Paper read before the Amer. Water-Works Assoc.) (24) July 13.  
 The Water Supply of Manila, P. I. (From the *New York Medical Record*.) (13) July 16.  
 Shall Water Departments Charge for Private Fire Lines, and Shall Meters Be Placed Thereon? F. A. W. Davis. (Paper read before Amer. Water-Works Assoc.) (13) July 16.  
 A High Masonry Dam in Germany.\* (13) July 16.  
 An Interesting Test of an Unfinished Arch Dam (Ithaca Water-Works).\* (14) July 18.  
 Surveys for Electrolysis and Their Results. D. H. Maury, M. Am. Soc. C. E. (Paper read before Amer. Water-Works Assoc.) (13) July 23.  
 The Failure of the Oakford Park and Fort Pitt Dams near Jeannette, Pa.\* Willis Whitel, Assoc. M. Am. Soc. C. E. (13) July 23.  
 Water Raising from Deep Wells by Compressed Air. William H. Maxwell, A. M. Inst. C. E. (Paper read before the British Assoc. of Water-Works Engrs.) (47) July 25.  
 Water for the Gold Fields of Western Australia.\* D. M. Bates. (10) Aug.  
 Remodeling a Chicago Pumping Station.\* (14) Aug. 1.  
 Venturi Meters on Municipal Supplies in the Massachusetts Metropolitan District.\* (14) Aug. 1.  
 Report of the Commission of the Jerome Park Reservoir. (13) Aug. 6.  
 The New Water-Works for Jersey City.\* (14) Aug. 8.  
 Ferrous Sulphate as a Coagulant in the Mechanical Filtration of Water. Ernest E. Irons. (14) Aug. 8.  
 Hydraulic-Electric Development of the Neversink Light and Power Company, Middletown, N. Y.\* (27) Aug. 8.  
 Stérilisation de l'Eau par l'Ozone.\* Ed. Imbeaux. (36) Serial beginning June 25.  
 Stérilisation et Filtration des Eaux d'Alimentation par les Procédés H. Desrumaux.\* F. Gramy. (36) July 25.

**Waterways.**

- Some Bucket-Ladder Dredges. Sidney Herbert Hunter, M. Inst. C. E. (63) Vol. cli.  
 A Small "Home-Made" Dipper Dredge or Steam Shovel.\* (13) May 14.  
 The 15-Cu. Yd. Dipper Dredge for the New York Harbor Improvements.\* (13) May 14.  
 The Corinthian Canal.\* (15) May 22; (10) July 25.  
 The Proposed Terminal at St. George, Staten Island.\* (17) May 30.  
 The Failure of a Sea Wall and Its Reconstruction.\* Clarence T. Fernald. (1) June.  
 The Panama Canal: The Dual *Versus* the Single-Lake Project. By Henry L. Abbot. With Reply by George S. Morison. (9) June.  
 Notes on Weirs in India.\* (12) Serial beginning June 5.  
 The Dover Harbour Works.\* (11) June 12.  
 A New Method of Automatic Sounding for Measuring Dredging. (13) June 18.  
 The New Harbor Works at Dover.\* Harold J. Shepstone. (19) June 27.  
 Electric Haulage on Canals. Frank C. Perkins. (46) June 27.  
 Modern European Excavating Machinery and Dredges.\* (41) July.  
 The Galveston Sea Wall.\* (14) July 4.  
 An Improved Centrifugal Dredging Pump.\* Mason M. Patrick. (13) July 9.  
 The Recent Mississippi River Floods and Their Relation to the Levees. T. G. Dabney. (13) July 9.  
 Belfast Harbour and Its Development.\* G. F. L. Giles, M. Inst. C. E. (Paper read before the Inst. of Naval Archts.) (11) July 17.  
 Notes on the Ports and Harbours of Peninsular India. Horace Bell, M. Inst. C. E. (29) July 17.  
 Experience in Diamond Drill Works on the Deep Waterways Survey, with Statistics of Cost. (13) July 24.  
 A Large Ore Dock at Escanaba, Mich.; Chicago & Northwestern Railway.\* (13) July 30.  
 The Proposed Forth-Clyde Ship Canal, Scotland. (13) Aug. 6.  
 Les Feux Flottants: Le Sandettié.\* M. Ribière. (43) 4<sup>e</sup> Trimestre, 1902.

\* Illustrated.



**Waterways—(Continued).**

Les Voies Navigables de l'Allemagne et plus particulièrement de la Prusse de 1875 à 1900. M. Duval. (43) 4<sup>e</sup> Trimestre, 1902.

L'Éclairage du Phare de Chassiron à l'Incandescence par l'Acétylène.\* M. de Joly. (43) 4<sup>e</sup> Trimestre, 1902.

Étude de l'Administration Actuelle du Port de Londres et du Projet de Transformation Présenté au Parlement par la Commission Royale Nommée à Cet Effet. M. Aron. (43) 4<sup>e</sup> Trimestre, 1902.

Les Phares du Sud de la Mer Rouge et Leur Installation.\* J. Benard. (32) Apr.

Écluse Oscillante, Système Cardot.\* A. Morel. (36) Serial beginning May 10.

Drague Marine Portense à Godets et à Succion du Port de Montevideo.\* Ch. Dantin. (33) May 23.

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\* Illustrated.



## AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1852.

## PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

## SOCIETY AFFAIRS.

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## MINUTES OF MEETINGS.

## OF THE SOCIETY.

**September 2d, 1903.**—The meeting was called to order at 8.45 p. m., President Noble in the chair; Chas. Warren Hunt, Secretary; and present, also, 70 members and 12 guests.

The minutes of the meeting of June 3d, and of the Business Meeting of the Annual Convention at Asheville, N. C., on June 9th and 10th, 1903, were approved as printed in *Proceedings* for August, 1903.

The Secretary brought to the attention of the meeting a resolution, by J. W. Schaub, M. Am. Soc. C. E., which had been passed at the meeting of June 11th of the Annual Convention, as follows:

“It is the sense of this meeting that a Special Committee be appointed to take up the question of concrete and steel-concrete, and that such committee co-operate with the Association for Testing Materials, and the Railway Engineers' Maintenance of Way Association, which also have a committee on this subject.”



The Secretary then moved, on behalf of Mr. Schaub, that a Special Committee on Concrete-Steel be appointed, and the matter referred to the Board of Direction. (Art. VI, Sec. 12 of the Constitution.)

The motion, being duly seconded, was adopted by a vote of more than twenty-five Corporate Members.

A paper, entitled "An Experimental Study of the Resistances to the Flow of Water in Pipes," by Augustus V. Saph, Assoc. Am. Soc. C. E., and Ernest W. Schoder, Jun. Am. Soc. C. E., was presented by the Secretary, who also read communications on the subject from Messrs. A. Flamant, Hiram F. Mills, E. C. Thrupp and Allen Hazen.

Ballots for membership were canvassed, and the following candidates elected:

#### AS MEMBERS.

GEORGE SAMUEL HAYES, New York City.  
RICHARD CARMICHAEL HOLLYDAY, Brooklyn, N. Y.  
LEONARD METCALF, Boston, Mass.  
OLAF EINAR MOGENSEN, St. Louis, Mo.  
WILLIAM BABCOCK POLAND, Cincinnati, Ohio.  
HORACE ROPES, South Framingham, Mass.

#### AS ASSOCIATE MEMBERS.

JOHN YANCEY BAYLISS, Bardstown, Ark.  
JAMES GEORGE BEACH, Philadelphia, Pa.  
CHARLES EDWARD FRASER, New York City.  
JULIAN HASTINGS GRANBERY, Elizabeth, N. J.  
ARTHUR NEWHALL JOHNSON, Baltimore, Md.  
JAMES AUGUSTUS KELLEY, Hedgesville, W. Va.  
CLIFFORD LEWIS, Jr., Utica, N. Y.  
ELBERT CLYDE MACY, St. Paul, Minn.  
NICHOLAS DAUBENEY MONSARRAT, Columbus, Ohio.  
JOSEPH EDGAR MURPHY, Galesburg, Ill.  
CHARLES FREDERIC PARKER, Mapimi, Durango, Mexico.  
CHARLES MARCELLUS PRITCHETT, Washington, D. C.  
WILLIAM EVERETT SWIFT, Washington, D. C.

The Secretary announced the election of the following candidates:

By the Board of Direction on September 1st, 1903;

#### AS ASSOCIATE.

MAXIMILIAN TOCH, New York City.

As JUNIORS.

JOHN HENRY BURGOYNE, Jr., Buffalo, N. Y.  
 SILAS STEWART FEETER, Little Falls, N. Y.  
 CARL HUGO JABELONSKY, New York City.  
 CLARENCE WILLIAM MEYERS, Ithaca, N. Y.  
 JOHN ENDICOTT PORTER, Danvers, Mass.  
 ALFRED FRANCIS SAUER, Elizabeth, N. J.  
 JAMES LLOYD TATLOCK, New Rochelle, N. Y.

On Reconsideration Ballot canvassed by the Board of Direction  
 September 1st, 1903:

As MEMBER.

FRANK CHURCHILL HORN, Cheesman, Colo.

The Secretary announced the following deaths:

ALPHONSE FTELEY, Past-President, Am. Soc. C. E., elected Member  
 January 5th, 1876; President, January 19th, 1898, to January 18th,  
 1899; died June 11th, 1903.

GEORGE SHATTUCK MORISON, Past-President, Am. Soc. C. E.; elected  
 Member January 5th, 1875; President, January 16th, 1895, to January  
 15th, 1896; died July 1st, 1903.

CHARLES CYRIL MARTIN, elected Member July 10th, 1872; Vice-  
 President, 1894-1895; died July 11th, 1903.

CHARLES FREDERICK DUNHAM, elected Member April 2d, 1902; died  
 June 13th, 1903.

FREDERICK WINN BOND, elected Member December 7th, 1898; died  
 July 12th, 1903.

EUGENE VANDERPOOL, elected Member September 2d, 1874; died  
 July 12th, 1903.

CORNELIUS PALMER, elected Member November 2d, 1887; died July  
 31st, 1903.

SYLVANUS THAYER ABERT, elected Member September 21st, 1870;  
 died August 11th, 1903.

JOHN ELFRETH WATKINS, elected Associate January 2d, 1889; died  
 August 11th, 1903.

The Secretary announced that the Board of Direction had decided  
 that the Annual Convention of 1904 would be held at St. Louis, Mo.,  
 during the week beginning October 3d, at which time there will also  
 meet an International Congress of Engineering, of which this Society  
 has been asked to take charge.

Adjourned.

**September 16th, 1903.**—The meeting was called to order at 8.45 p. m. President Noble in the chair; Chas. Warren Hunt, Secretary; and present, also, 65 members and 14 guests.

A paper entitled "Theory of Centrifugal Pumps and Fans; Analysis of Their Action, with Suggestions for Designs," by Elmo G. Harris, M. Am. Soc. C. E., was presented by the Secretary, who also read communications on the subject by Messrs. William Mayo Venable and E. T. Adams. The paper was discussed further by Messrs. Allen Hazen and W. M. White.

A second paper, entitled "Tests of the Efficiency of Hoisting Tackle," by S. P. Mitchell, M. Am. Soc. C. E., was also presented by the Secretary.

The Secretary announced the following deaths :

JOHN AUSTIN PATTERSON, elected Member May 2d, 1900; died May 3d, 1903.

REUEL WILLARD WARE, elected Member April 1st, 1874; died September 11th, 1903.

ROBERT DELANO CUSHING, elected Associate Member September 6th, 1899; died September 8th, 1903.

Adjourned.

## OF THE BOARD OF DIRECTION.

(Abstract.)

**September 1st, 1903.**—8.35 p. m.—President Noble in the Chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Craven, Davison, Knap, Moore, Osborn, Osgood, Pegram, Schneider and Wilgus.

It was decided to hold the Thirty-sixth Annual Convention of the Society at St. Louis, Mo., during the week beginning October 3d, 1904.

Under a resolution of the last Annual Meeting, to the effect that the Society should co-operate with the Louisiana Purchase Exposition Company in the inauguration of an International Congress of Engineering, and the Society having been invited by the Exposition authorities to take charge of such International Congress, the following Committee to represent the Society in the matter was appointed:

<i>Chairman</i> , HENRY S. HAINES;	<i>Vice-Chairman</i> , L. F. G. BOUSCAREN;
WILLIAM METCALF,	BENJAMIN M. HARROD,
WILLIAM P. CRAIGHILL,	M. T. ENDICOTT,
E. L. CORTHELL,	JOSEPH RAMSEY, Jr.,
ROBERT W. HUNT,	L. B. STILLWELL,
A. A. ROBINSON,	GEORGE B. POST,
M. L. HOLMAN,	PALMER C. RICKETTS,
<i>Treasurer</i> , JOSEPH M. KNAP;	<i>Secretary</i> , CHAS. WARREN HUNT.

Reconsideration Ballots were canvassed and Frank Churchill Horn was declared elected a Member of the Society.

A report was received from the Committee representing the Board in the matter of the proposed Joint Engineering Building, and the following resolution was unanimously adopted:

*Whereas*, at the Annual Convention held at Asheville, June 10th, 1903, resolutions were passed authorizing the Board of Direction to hold conferences bearing on the advisability of the acceptance of Mr. Carnegie's proposition to this Society for a proposed Union Engineering Building, and

*Whereas*, at a meeting of the Joint Committee on said Building the Committee representing this Board expressed the opinion that unless an entire division of the building, fund, and management, is made between the Engineers' Club, and the four technical societies proposing to use said building, this Board cannot see its way clear to recommend to the American Society of Civil Engineers the proposition to join with the others in the project.

*Resolved*, that the said action of the Committee of this Board is hereby endorsed as having the approval of the Board of Direction of the Society.

The following Committee to recommend the award of prizes for the year ending with the *Transactions* of June, 1903, was appointed: Charles E. Greene, E. P. Dawley, Wynkoop Kiersted.

The report of the Nominating Committee was received.

Applications were considered and other routine business transacted.

One candidate for admission as Associate, and seven as Junior were elected.\*

Adjourned.

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\* See pages 342 and 343.

## ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

## MEETINGS.

Wednesday, October 7th, 1903.—8.30 P. M.—A regular business meeting will be held. Ballots for membership and ballots on the proposed amendment to the Constitution will be canvassed, and a paper by Francis Robert Johnson, M. Am. Soc. C. E.; entitled "South African Irrigation," will be presented for discussion.

This paper was printed in *Proceedings* for August, 1903.

Wednesday, October 21st, 1903.—8.30 P. M.—At this meeting two papers will be presented, as follows: "Some Railway Construction in Oklahoma," by A. G. Allen, Assoc. M. Am. Soc. C. E.; and "The Fatigue of Cement Products," by J. L. Van Ornum, M. Am. Soc. C. E.

These papers were printed in *Proceedings* for August, 1903.

Wednesday, November 4th, 1903.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper by Eugene Goetze, Esq., entitled "Filtration for Public Water Supplies, with Especial Reference to the Double Filtration Plant at Bremen, Germany," will be presented for discussion.

This paper is printed in this number of *Proceedings*.

Wednesday, November 18th, 1903.—8.30 P. M.—At this meeting a paper by George Cecil Kenyon, Assoc. M. Am. Soc. C. E., entitled "Dock Improvements at Liverpool," will be presented for discussion.

This paper is printed in this number of *Proceedings*.



### SEARCHES IN THE LIBRARY.

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many such searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction to the members who have made use of the resources of the Society in this manner has been expressed frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling compared to the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

Copies of all lists of references are filed, so that in many cases it is only necessary to make a typewritten copy, which reduces the cost of searches to a minimum.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

### UNIVERSAL EXPOSITION, ST. LOUIS, 1904.

The Society has undertaken to provide for an Engineering Exhibit, and the establishment of Headquarters for visiting engineers, and the Board of Direction has appropriated sufficient funds to defray the necessary expense.

This matter is in the hands of the following Committee:

ROBERT MOORE, M. Am. Soc. C. E., St. Louis, Mo., *Chairman*.

EDWARD C. CARTER, M. Am. Soc. C. E., Chicago, Ill.

MORDECAI T. ENDICOTT, M. Am. Soc. C. E., Washington, D. C.

JAMES L. FRAZIER, " " Frankfort, Ind.

WILLIAM JACKSON, " " Boston, Mass.

EMIL KUICHLING, " " New York, N. Y.

JOHN F. WALLACE, " " Chicago, Ill.

H. J. PFEIFER, Assoc. M. Am. Soc. C. E., St. Louis, Mo., *Secretary*.

## INTERNATIONAL ENGINEERING CONGRESS.

The Society has also agreed to take charge of an International Engineering Congress to be held at St. Louis during the week beginning October 3d, 1904, and has appointed the following Committee, under whose supervision this work will be carried on:

HENRY S. HAINES, M. Am. Soc. C. E.,	New York, N. Y.,	<i>Chairman.</i>
L. F. G. BOUSCAREN,	" "	Cincinnati, O., <i>Vice-Chairman.</i>
WILLIAM MEICALE,	" "	Pittsburg, Pa.
BENJAMIN M. HARROD,	" "	New Orleans, La.
WILLIAM P. CRAIGHILL,	" "	Charlestown, W. Va.
M. T. ENDICOTT,	" "	Washington, D. C.
E. L. CORTHELL,	" "	New York, N. Y.
JOSEPH RAMSEY, Jr.,	" "	St. Louis, Mo.
ROBERT W. HUNT,	" "	Chicago, Ill.
L. B. STILLWELL,	" "	New York, N. Y.
A. A. ROBINSON,	" "	St. Louis, Mo.
GEORGE B. POST,	" "	New York, N. Y.
M. L. HOLMAN,	" "	St. Louis, Mo.
PALMER C. RICKETTS,	" "	Troy, N. Y.
JOSEPH M. KNAP,	" "	New York, N. Y., <i>Treasurer.</i>
CHAS. WARREN HUNT,	" "	New York, N. Y., <i>Secretary.</i>

## ANNUAL CONVENTION, 1904.

It has also been decided to hold the Thirty-sixth Annual Convention at St. Louis during the same week (beginning October 3d, 1904).

It is expected and hoped that the visit of members of the Institution of Civil Engineers to this country, by invitation of this Society, will be so timed that their participation in the International Engineering Congress will be assured.

As the details of the above matters are developed, they will be announced in *Proceedings*.

## ACCESSIONS TO THE LIBRARY.

From August 9th to September 8th, 1903.

## DONATIONS.\*

## TELEPHONY.

A Manual of the Design, Construction, and Operation of Telephone Exchanges. By Arthur Vaughan Abbott. Parts I-III. Cloth, 8 x 6 ins., illus. New York, McGraw Publishing Company, 1903. \$1.50 per volume; set of six, \$6.00.

It has been the endeavor of the author to collect in this series the consensus of what appears to be the best prevailing practice, in the hope that it may at least serve as a guide-post along the telephonic road. Part I, commences with rules for the selection of the office site. Part II, deals with the history of conduit construction. It endeavors to portray and describe the conduit forms of the present, such as experience has sanctioned. In Part III, the author has collected such data as he believes may be of service to the telephone engineer in the design and installation of the underground portion of the wire circuits, and has pointed out the principal direction which the probable trend in the design and manufacture of the cables of the future will take.

## CHIMNEY DESIGN AND THEORY.

A Book for Engineers and Architects. By William Wallace Christie. M. Am. Soc. M. E. Second Edition, Revised and Enlarged. Cloth, 9 x 6 ins., 8 + 192 pp., illus. New York, D. Van Nostrand Company, 1902. \$3.00.

To this edition some twenty-five pages of text and twelve full-page illustrations have been added. Radial brick chimneys, which were just being introduced in the United States as the first edition went to press, are now treated briefly. The author has endeavored to round out the work, thus meeting some of the criticisms made by the reviewers of the original publication. The Contents are: Introduction and History; Theory of Chimney Draft; Chimney Formulæ; Chimney Tables, Wind Pressure, Air-Space in Grates; Foundation Materials, Brick Chimney Materials; Steel Chimneys—Theory Pertaining to Same, and Examples from Existing Structures; Brick Chimneys—Theory Pertaining to Same, and Examples from Existing Structures; Chimney Performances—Special Types—Straightening Chimneys—Flues; House Chimneys; Lighting Protection; General Information. There is an index of eleven pages.

## STONES FOR BUILDING AND DECORATION.

By George P. Merrill. Third Edition, Revised and Enlarged. Cloth, 9 x 6 ins., 11 + 551 pp., illus. New York, John Wiley & Sons, 1903. \$5.00.

The preface states that this work is based upon the author's handbook and catalogue of the collection of building and ornamental stones in the United States National Museum at Washington. The book has been written from an American standpoint, and treats principally of stones found within the limits of the United States, or imported from other sources. In but few instances are stones mentioned that are of purely historical interest. The changes introduced in the present edition consist of much additional material, correction of errors where found, and an entire revision of the chapter on methods of testing. A brief chapter on the use of drift boulders for building purposes has also been introduced. Some new illustrations, including five maps showing the geographic distribution of the more important stones, have been added. The Contents are: Historical; The Geographical Distribution of Building-Stones in the United States; The Minerals of Building-Stones; Physical and Chemical Properties of Building-Stones; Rock Classification; Geological Record; Igneous Rocks; Aqueous Rocks; Methods of Quarrying and Dressing Stone; Machines and Implements used in Stone-Working; The Weathering of Building-Stone; On the Selection and Testing of Building-Stone; Methods of Protection and Preservation; Appendices. There is an index of eleven pages.

\* Unless otherwise specified, books in this list have been donated by the Publishers.

**THE ELASTICITY AND RESISTANCE OF THE MATERIALS OF ENGINEERING.**

By Wm. H. Burr, M. Am. Soc. C. E.; M. Inst. C. E. Sixth Edition. Rewritten and Enlarged. Cloth, 9 x 6 ins., 15 + 990 + 80 pp., illus. New York, John Wiley & Sons, 1903. \$7.50.

The preface states that the present edition of this work constitutes almost a new book, one half of more of the entire volume being new matter. Much of the latter contains original matter not hitherto published. Portions of those chapters on combined bending and direct stress and on the theory and design of concrete-steel members are of this nature. The effort has been to set forth the treatment of concrete-steel beams and other members with fulness, in order to meet the requirements of that rapidly extending field of engineering construction. The author has been permitted to include in this volume a set of tables and cuts of rolled shapes taken from the Handbook of the Cambria Steel Company. The chapters are: Elementary Theory of Elasticity in Amorphous Solid Bodies; Hollow Cylinders and Spheres and Torsion; Flexure; Resilience; Combined Stress Condition; Tension; Compression; Shearing and Torsion; Bending or Flexure; Concrete-Steel Members; Rolled and Cast Flanged Beams; Connections; Plate Girders; Ropes and Chain Cables; Miscellaneous Problems; Working Stresses and Safety Factors; The Fatigue of Metals; The Flow of Solids; General Equations; Thick Hollow Cylinders and Spheres, and Torsion; Energy of Elasticity; Theory of Flexure; Another Method for Finding Pitch of Rivets. There is an index of twelve pages.

**MODERN MACHINE SHOP TOOLS.**

Their Construction, Operation and Manipulation, Including Both Hand and Machine Tools. By William H. Van Dervoort. Cloth, 9 x 6 ins., 552 pp., illus. New York, Norman W. Henley & Company, 1903. \$4.00.

This book is an outgrowth of a series of articles prepared by the author for the students in machine-shop practice at the University of Illinois; some of these articles having been published recently in "Machinery." An effort has been made to treat the subject in a comprehensive manner, avoiding all unnecessary matter and presenting to the apprentice and mechanic many points pertaining to the tools with which they come in daily contact, and about which they are often unable to obtain all the information necessary, in order that they may use these tools correctly and efficiently. The chapter headings are: The Hammer and Cold Chisel; The File and Filing; Scrapers and Scraped Surfaces; Standards of Measure; Calipers; Gauges and Indicators; Rules, Squares and Other Small Tools; Drills; Reamers; Taps and Dies; Drill and Tap Holders; Mandrels; The Lathe; The Lathe in Modified Forms; Lathe Tools; Chucks and Drivers for Lathe Work; Lathe Work, between Centers; Lathe Work on Face Plate, Chuck and Carriage; Boring and Turning Mills; Planing and Shaping Machines, Their Tools and Attachments; Planer and Shaper Work; The Slotting Machine and Key Seater; Milling Machines; Milling Machine Cutters; Milling Machine Work; Gear Cutters and Gear Cutting; Drilling Machines and Drilling Work; Grinding Machines and Grinding; Hardening and Tempering; Fastenings; Gearings; Belting and Transmission Machinery; Miscellaneous Shop Equipment and Conveniences; Useful Tables and Data. There is an index of eight pages.

**ELECTRICAL ENGINEERING.**

An Elementary Text-Book Suitable for Persons Employed in the Mechanical and Electrical Engineering Trades, for Elementary Students of Electrical Engineering, and for All Who Wish to Acquire a Knowledge of the Chief Principles and Practice of the Subject. By E. Rosenberg. Translated by W. W. Haldane Gee, A. M. I. E. E., and Carl Kinzbrunner. Cloth, 9 x 6 ins., 13 + 267 pp., illus. New York, John Wiley & Sons, 1903. \$1.50.

This book had its origin in a number of lectures which the author delivered to the workmen and the staff of a large electrical manufacturing firm. The circle of readers for which this book is intended is, in the first place, the same as that to which the audience belonged. It is intended to give workmen of electrical engineering works the knowledge of the operation of machines and apparatus with which they are concerned. The author has endeavored to use language which people who have only a general school education should be able to understand. In the translation, some change from the original has been inevitable in giving an English dress to the work. The illustrations have been revised, and a number from English firms have been added. The chapter headings are: Fundamental Principles; Magnets—Magnetic Lines of Force; The Continuous-Current Dynamo; The Electric Motor; Accumulators; Working of Dynamos in Parallel; Electric Lighting; Alternating Currents; Alternators; Alternating-Current Motors; Multiphase Alternating-Current; High Tension. There is an index of three pages.



## CATALOGUE OF THE NATIONAL FIRE PROOFING COMPANY OF PITTSBURGH.

Abridged Edition. Author and Compiler, Henry L. Hinton. Morocco, 7 x 5 ins., unpagcd, illus. New York, National Fire Roofing Company, 1903. \$3.00.

This edition of the catalogue, as is stated in the preface, consists chiefly of a selection of completed pages as electrotyped for an unabridged edition of a forthcoming work in eight different divisions, four of which only are represented here, and these only in part. The following is a synopsis of the abridged edition: Side-Construction Flat Arches; End-Construction Flat Arches; Combination Construction Flat Arches; "Lintels;" Segmental Arches; Serrated Arches; Girder-Covering Construction; Typical Methods of Construction; Condensed Safe Load Tables; Moment of Resistance Tables—for Beams; Sound-Proof Tests.

## AMERICAN STREET RAILWAY INVESTMENTS.

Published annually by the *Street Railway Journal*. For the Use of Bankers, Brokers, Capitalists, Investors and Street Railway Companies. Tenth Annual Volume. 1903. McGraw Publishing Company, New York. \$5.00.

The reports of the various railways of which about 1,360 are included in this work, are this year arranged alphabetically by States. There is a comparative table of the gross receipts in 1901 and 1902. The reports for each company give a brief general description of the road, its equipment, operation, traffic and financial statistics, list of officers, etc.

## Gifts have also been received from the following:

- |  |  |
|--|--|
| Aachen Technische Hochschule. 1 pam.                                 | Linton, Harvey. 1 vol.   |
| Allentown, Pa.—Water Dept. 1 pam.                                    | Liverpool Eng. Soc. 1 vol.                                     |
| Am. Inst. of Arch. 1 vol.  | Manson, Marsden. 1 pam.  |
| Am. Inst. of Elec. Engrs. 1 pam.                                     | Medford, Mass.—Water Comms. 1 pam.                             |
| Am. Ry. Eng. and M. of W. Assoc. 1 pam.                              | Merrill, F. J. H. 1 vol.                                       |
| Am. Soc. Mech. Engrs. 1 pam.   | Metropolitan District Ry. Co. 4 pam.                           |
| Anthracite Coal Operators' Assoc. 1 pam.                             | Mich. Coll. of Mines. 1 vol.                                   |
| Assoc. des Ingénieurs Sortis des Écoles<br>Spéciales de Gand. 1 pam. | Midland Ry. Co. 1 pam.   |
| Assoc. of Railway Telegraph Supts. 1<br>pam.                         | Min. Soc. of Nova Scotia. 1 pam.                               |
| Beveridge, A. J. 1 pam.  | Montreal—Harbour Comms. 3 pam.                                 |
| Boston, Mass.—Board of Gas and Elec.<br>Light Comms. 1 vol.          | New Britain, Conn.—Water Comms. 2<br>pam.                      |
| Boston, Mass.—Dept. of Parks. 1 pam.                                 | New Brunswick, N. J.—Water Comms.<br>1 pam.                    |
| Cal.—Board of State Harbor Comms. 4<br>pam.                          | New England Cotton Mfrs. Assoc. 1 bound<br>vol.                |
| Canada—Dept. of Agri. 6 bound vol., 4<br>vol.                        | N. Y. City—Dept. of Water Supply, Gas &<br>Electricity. 2 pam. |
| Canada—Dept. of Pub. Works. 17 vol.                                  | North, Edward P. 1 bound vol., 4 vol., 4<br>pam.               |
| Chicago, Ill.—Health Dept. 1 bound vol.                              | Philadelphia, Pa.—Bureau of Surv. 1<br>bound vol.              |
| Chicago & North Western Ry. Co. 1 pam.                               | Philadelphia, Pa.—Bureau of Water. 1<br>bound vol.             |
| Cooper Union. 27 pam.  | Philadelphia Commercial Museum. 1<br>pam.                      |
| Denver, Colo.—State Engr. 1 bound vol.                               | Polytechnic Inst. of Brooklyn. 1 vol.                          |
| Dingle, J. H. 1 bound vol.   | Ricketts, Palmer C. 2 vol.                                     |
| Doremus, A. F. 1 pam.  | St. John, N. B.—Water and Sewerage<br>Dept. 1 pam.             |
| Engrs. Club of St. Louis. 1 pam.                                     | Tillson, G. W. 1 vol.  |
| Fisk, W. L. 1 map, 1 vol., 4 pam.                                    | Tombo, Carl. 1 vol.  |
| Flynn, John, Jr. 2 bound vol., 1 pam.                                | U. S. Bureau of Insular Affairs. 6 vol.                        |
| Ga.—State Geologist. 1 bound vol.                                    | U. S. Bureau of Labor. 1 pam.                                  |
| Gila Valley, Globe & Northern Ry. Co. 1<br>pam.                      | U. S. Chf. of Engrs. 14 specif.                                |
| Great Britain—Patent Office. 9 pam., 7<br>vol.                       | U. S. Office of Exper. Stations. 1 pam.                        |
| Hannover Technische Hochschule. 1 pam.                               | U. S. Weather Bureau. 1 bound vol.                             |
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## BY PURCHASE.

**Gas and Petroleum Engines.** A Manual for Students and Engineers. By William Robinson, M. Inst. C. E., M. Inst. M. E., M. Inst. E. E. Second Edition, Completely Rewritten. London, E. & F. N. Spon, Ltd.; New York, Spon & Chamberlain, 1902.

**The Metallurgy of Zinc and Cadmium.** By Walter Renton Ingalls. *Engineering and Mining Journal*. New York, London, 1903.

**Modern Electrolytic Copper Refining.** By Titus Ulke. New York, John Wiley and Sons; London, Chapman & Hall, Limited, 1903.

**The Hydro-Metallurgy of Copper, Being An Account of Processes Adopted in the Hydro-Metallurgical Treatment of Cupriferous Ores, Including the Manufacture of Copper Vitriol . . . with Chapters on the Sources of Supply of Copper and Roasting of Copper Ores.** By M. Eissler. London, Crosby Lockwood and Son, 1902.

**Ore-Deposits.** A Discussion Re-Published from the *Engineering and Mining Journal*. New York, May, 1903. New York and London, *The Engineering and Mining Journal*, 1903.

**The Louisiana Purchase and Our Title West of the Rocky Mountains,** with a Review of Annexation by the United States. By Binger Hermann. Washington, Government Printing Office, 1900.

**The Michigan Engineer,** Containing the Proceedings of the Michigan Engineering Society, 1902-03. 2 vol. Published by the Society, Climax, Mich., 1902-03.

**The American Woods, Exhibited by Actual Specimens and with Copious Explanatory Text.** By Romeyn B. Hough. Parts I-IX. Lowville, N. Y., Published and Sections Prepared by the Author, 1892-1903.

**Repertorium der technischen Journal-Literatur.** Herausgegeben im kaiserlichen Patentamt. 1902. Berlin, Carl Heymann, 1903.

**Railway Legislation in the United States.** By Balthasar Henry Meyer. New York, The Macmillan Company; London, Macmillan & Co., Ltd., 1903.

**American Street Railway Investments** A Supplement to the *Street Railway Journal*. Published Annually for the Use of Bankers, Brokers, Capitalists, Investors, and Street Railway Companies; 1894-1902. 9 vol. New York, Street Railway Publishing Company, 1894-1902.

**Colonial and Camp Sanitation.** By George Vivian Poore. Longmans, Green and Co., London, New York and Bombay, 1903.

**Building Superintendence.** A Manual for Young Architects, Students and Others Interested in Building Operations as Carried on at the Present Day. By T. M. Clark. New Edition, Revised and

Rewritten. New York, The Macmillan Company; London, Macmillan & Co., Ltd., 1903.

**A Treatise on Hydraulics.** By Henry T. Bovey. Second Edition. Rewritten. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1902.

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#### SUMMARY OF ACCESSIONS.

August 9th to September 8th, 1903.

Donations (including 13 duplicates).....	255
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Total.....	278

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	M.	Sept. 2, 1903
MOGENSEN, OLAF EINAR. Chf. Engr.'s Office, Mo. Pac. Ry. Co., St. L., I. M. & S. Ry. Co., and Leased, Operated and Independent Lines, 502 Missouri Pacific Bldg., St. Louis, Mo..	Assoc. M.	April 7, 1897
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FELLOWS.

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DEATHS.

ABERT, SYLVANUS THAYER.....	Elected Member September 21st, 1870; died August 11th, 1903.
PALMER, CORNELIUS.....	Elected Member November 2d, 1887; died July 31st, 1903.
WARE, REUEL WILLARD.....	Elected Member April 1st, 1874; died September 10th, 1903.
WATKINS, JOHN ELFRETH. ....	Elected Associate January 2d, 1889; died August 11th, 1903.

# MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(Aug. 9th to Sept. 8th, 1903.)

NOTE. This list is published for the purpose of placing before the members of the Society the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.

## LIST OF PUBLICATIONS.

In the subjoined list of articles references are given by the number prefixed to each journal in this list.

- (1) *Journal*, Assoc. Eng. Soc., 274 South Fourth St., Philadelphia, Pa., 30c.
- (2) *Proceedings*, Eng. Soc. of Phila., 1122 Girard St., Philadelphia, Pa., 50c.
- (3) *Journal*, Franklin Inst., Philadelphia, Pa., 50c.
- (4) *Journal*, Western Soc. of Engrs., Mont Brook Park, Chicago, Ill.
- (5) *Transactions*, Can. Soc. C. E., Montreal, Que., Canada.
- (6) *School of Mines Quarterly*, Columbia Univ., New York City, 50c.
- (7) *Technology Quarterly*, Mass. Inst. Tech., Boston, Mass., 15c.
- (8) *Stevens Institute Indicator*, Stevens Inst., Hoboken, N. J., 50c.
- (9) *Engineering Magazine*, New York City, 25c.
- (10) *Cities Magazine*, New York City, 25c.
- (11) *Engineering* (London), W. H. Wiley, New York City, 25c.
- (12) *The Engineer* (London), International News Co., New York City, 35c.
- (13) *Engineering News*, New York City, 15c.
- (14) *The Engineering Record*, New York City, 12c.
- (15) *International Gazette*, New York City, 10c.
- (16) *Engineering and Mining Journal*, New York City, 15c.
- (17) *Street Railway Journal*, New York City, 35c.
- (18) *Railway and Engineering Review*, Chicago, Ill., 10c.
- (19) *Scientific American Supplement*, New York City, 10c.
- (20) *Iron Age*, New York City, 10c.
- (21) *Railway Engineer*, London, England, 25c.
- (22) *Iron and Coal Trades Review*, London, England, 25c.
- (23) *Bulletin*, American Iron and Steel Assoc., Philadelphia, Pa.
- (24) *American Gas Light Journal*, New York City, 10c.
- (25) *American Engineer*, New York City, 25c.
- (26) *Electrical Review*, London, England.
- (27) *Electrical World and Engineer*, New York City, 10c.
- (28) *Journal*, New England Water Works Assoc., Boston, \$1.
- (29) *Journal*, Society of Arts, London, England, 15c.
- (30) *Annales des Travaux Publics de Belgique*, Bruxelles, Belgique.
- (31) *Travaux de l'Assoc. des Ing. Sortes des Ecoles Speciales de Gand*, Brussels, Belgium.
- (32) *Mémoires et Compte Rendu des Travaux*, Soc. Ing. Civ. de France, Paris, France.
- (33) *Le Génie Civil*, Paris, France.
- (34) *Portfeuille Économique des Machines*, Paris, France.
- (35) *Nouvelles Annales de la Construction*, Paris, France.
- (36) *La Revue Technique*, Paris, France.
- (37) *Revue de Mécanique*, Paris, France.
- (38) *Revue Générale des Chemins de Fer et des Tramways*, Paris, France.
- (39) *Railway Master Mechanic*, Chicago, Ill., 10c.
- (40) *Railway Age*, Chicago, Ill., 10c.
- (41) *Modern Machinery*, Chicago, Ill., 10c.
- (42) *Transactions*, Am. Inst. Elec. Engrs., New York City, 50c.
- (43) *Annales des Ponts et Chaussées*, Paris, France.
- (44) *Journal*, Military Service Institution, Governor's Island, New York Harbor, 50c.
- (45) *Mines and Minerals*, Scranton, Pa., 20c.
- (46) *Scientific American*, New York City, 8c.
- (47) *Mechanical Engineer*, Manchester, England.
- (48) *Transactions*, Am. Soc. C. E., New York City, \$5.
- (49) *Transactions*, Am. Soc. M. E., New York City, \$10.
- (50) *Transactions*, Am. Inst. Min. Engrs., New York City, \$5.
- (51) *Colliery Guardian*, London, England.
- (52) *Proceedings*, Eng. Soc. W. Pa., 410 Penn. Ave., Pittsburgh, Pa., 50c.
- (53) *Transactions*, Mining Inst. of Scotland, London and Newcastle-upon-Tyne.
- (54) *Municipal Engineering*, Indianapolis, Ind., 25c.
- (55) *Proceedings*, Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.
- (56) *American Manufacturer and Iron World*, 59 Ninth St., Pittsburgh, Pa.
- (57) *Minutes of Proceedings*, Inst. C. E., London, England.
- (58) *Power*, New York City, 20c.
- (59) *Official Proceedings*, New York Railroad Club, Brooklyn, N. Y., 15c.
- (60) *Journal of Gas Lighting*, London, England, 15c.
- (61) *Cement and Engineering News*, Chicago, Ill., 25c.
- (62) *Mining Journal*, London, England.

**Bridge.**

- Erection of the Nairne Viaducts, near Adelaide, South Australia. Walter Edmund Cook, M. Inst. C. E. (63) Vol. clii.
- Early and Curious Types of the Cantilever Bridge in New England and New Brunswick. Alfred W. Parker. (Paper read before the Boston Soc. of Civ. Engrs.) (1) July.
- Cantilever Bridge at Connel Ferry.\* (11) July 31.
- The New Manhattan Bridge. (12) Aug. 11.
- The Wabash Bridge at Pittsburg.\* (15) Aug. 11.
- The Specifications for the Superstructure of the Blackwell's Island Bridge.\* (14) Aug. 22.
- The Blackwell's Island Bridge.\* (15) Aug. 28.
- The Superstructure for the Blackwell's Island Bridge Across the East River at New York City.\* (13) Sept. 3.
- Repairing the Williamsburg Bridge Cables.\* (14) Sept. 5.
- Erection of the Atlantic Avenue Improvement Viaduct, Brooklyn.\* (14) Sept. 5.
- Note sur le Calcul Graphique des Ponts en Arc à Triple Articulation par la Méthode des Lignes d'Influence. M. Jaeger. (43) 1er Trimestre.
- Mémoire sur la Reconstruction du Pont de Frans.\* G. Canat. (43) 1er Trimestre.

**Electrical.**

- The Cauvery Power-Transmission Scheme. Harold Thornthwaite Hincks, Assoc. M. Inst. C. E. (63) Vol. clii.
- Electric Automobiles.\* Henry Francis Joel, Assoc. M. Inst. C. E. (63) Vol. clii.
- The Experimental Basis for the Theory of the Regulation of Alternators.\* B. A. Behrend. (42) June.
- A Study of the Heyland Machine as Motor and Generator.\* Comfort A. Adams. (42) June.
- The Compounding of Self-Excited Alternating Current Generators for Variation in Load and Power Factor.\* A. S. Garfield. (42) June.
- A Discussion of Some Points in Alternating Current Theory.\* W. S. Franklin. (42) June.
- Some Features of Telephone Traffic and Their Effect on Service. J. G. Wray. (42) June.
- Properties of Wire Used in Telephone Work. R. A. L. Snyder. (58) June.
- Electric Rock Drills. E. J. Munby. (8) July.
- Hot Wire Enclosed Arc Lamps.\* H. Tomlinson-Lee. (26) July 31.
- The Possibilities of Future Economies in Electrical Illumination. W. A. Chamen. (Paper read before the Incorporated Municipal Elec. Assoc.) (47) Aug. 1.
- The Necessity for Precision of Statement in Technical Work. H. M. Hobart. (26) Serial beginning Aug. 7.
- Development of Electric Station Power Plant. Elihu Thomson. (Abstract of Paper read before the National Elec. Light Assoc.) (47) Aug. 8.
- Notes on a Subaqueous Electric Power Cable.\* (13) Aug. 13.
- A Mexican Water-Power Electric Plant.\* (13) Aug. 13.
- Tests on Broken Cables—Some Inconsistencies in Localization Formulæ. E. Raymond-Barker. (26) Serial beginning Aug. 14.
- Wimbledon Electricity Works.\* (26) Aug. 14.
- A Combined Railway. Lighting and Ice Plant at Hampton, Va.\* (14) Aug. 15.
- The Electric Installation on Board U. S. Battleships *Connecticut* and *Louisiana*.\* R. M. Klein. (27) Aug. 15.
- The Electrical Plant in the Newark Free Public Library.\* (27) Aug. 15.
- Electric Conduit Construction at Cincinnati, O.\* (13) Aug. 20.
- Hydro-Electric Works at La Praz.\* (12) Aug. 21.
- Tangential Traction. (26) Serial beginning Aug. 21.
- Necessary Practical Safeguards against Fires Caused by Lightning. Alfred Hands. (Abstract of Paper read before the International Fire Prevention Congress.) (26) Aug. 21.
- The New Cuban Telegraphic Service.\* Chas. Minor Blackford, Jr. (19) Aug. 22.
- The New Denver Telephone Exchange of the Colorado Telephone Company.\* C. W. Whitney. (27) Aug. 22.
- Leblanc Rectifying Transformer.\* (27) Aug. 22.
- Electrical Plant Failures: Their Origin and Prevention. A. Campbell Cormack. (Abstract of Paper read before the Inst. of Min. Engrs.) (47) Aug. 22; (13) Sept. 3.
- Electricity in the Shop—Speed Regulation of Motors.\* H. M. Phillips. (62) Serial beginning Aug. 27.
- The Water Power Plant of the Columbia Mills Company, Columbia, S. C.\* (14) Aug. 29.
- Compound Wound vs. Shunt Converters. P. M. Lincoln. (17) Aug. 29.
- Possible Economies in Central Station and Distribution Systems. Philip Dawson. (17) Aug. 29.
- The Transmission of a 23 000-Volt Direct Current over a Distance of Thirty-five Miles.\* Emile Guarini. (19) Aug. 29.
- The Nernst Incandescent Lamp.\* (19) Aug. 29.
- The Earth as a Condenser and Its Role in Wireless Telegraphy. (27) Aug. 29.
- Feeder Calculations for Direct Current Railways. (27) Aug. 29.



**Electrical—(Continued).**

- Some Tests of Recording Wattmeters. Ingwald A. Rosok. (27) Aug. 22; (24) Aug. 31.  
 Great Electric Installations of Italy: The Rome-Tivoli Power Plant and Transmission.\* Enrico Bignami. (9) Sept.  
 Aluminium Conductors for Electric Transmission Lines. Alton D. Adams. (6) Sept.  
 Power Plant of the Pittsburg, McKeesport & Connellsville Railway.\* (14) Sept. 5.  
 Rouleau Compresseur-Corroyeur Électrique; Système P. Sarrazin. (35) Aug.  
 État Actuel du Labourage Électrique.\* Emile Guarini. (33) Aug. 22.

**Marine.**

- Dry Dock at Riley's Hill on the Richmond River, New South Wales.\* Alexander Donald Craig, Assoc. M. Inst. C. E. (63) Vol. clii.  
 A Steam Lifeboat.\* (11) Aug. 14.  
 American Vessels, Naval and Mercantile. (12) Aug. 14.  
 The New Floating Dock for Durban.\* (12) Aug. 14.  
 The Modern Racing Yacht an Engineering Proposition.\* W. P. Stephens. (9) Sept.  
 Application des Moteurs à Pétrole à la Navigation.\* A. Bochet. (32) June.  
 Le Paquebot à Turbines *The Queen* du Service Calais-Douvres.\* A. Dumas. (33) Aug. 1.

**Mechanical.**

- The Riedler Pump.\* H. D. D. Barman. (59) Vol. xxv, Pt. 4.  
 Stuffing-Boxes Dispensed with on Engines and Pumps. Andrew Watson. (59) Vol. xxv, Pt. 4.  
 Steel Forgings. T. D. Lynch. (58) June.  
 Some Characteristics of Good Forgings and Some Things to Avoid. James H. Baker. (58) June.  
 Drop Forging. Dwight Goddard. (58) June.  
 Cold Rolled Steel. J. J. Crane. (58) June.  
 Power Plant Design. R. W. Stovel. (58) June.  
 The Burning of Pulverized Coal. C. O. Bartlett. (Paper read before the Civ. Engineers' Club of Cleveland.) (1) July.  
 A New Form of Friction Clutch.\* H. S. Hele-Shaw. (Paper read before the Inst. of Mech. Engrs.) (11) July 31; (47) Serial beginning Aug. 8; (Abstract) (26) Aug. 21; (Abstract) (57) Aug. 21.  
 The New Plant at the Duquesne Works of the Carnegie Company.\* (22) July 31.  
 The Diesel Engine.\* H. Ade Clark. (Paper read before the Inst. of Mech. Engrs.) (11) Serial beginning July 31; (47) Serial beginning Aug. 1.  
 Coal and Coke Handling Plant at the Dunfermline Gas-Works. Alexander Waddell. (Paper read before the North British Assoc. of Gas Managers.) (66) Aug. 4.  
 Remarks upon the Principles Involved in the Production of Gases from Coal, and Suggestions as to Their Application in Future Developments. William Young. (Paper read before the North British Assoc. of Gas Managers.) (66) Aug. 4.  
 Experiments on the Efficiency of Non-Conducting Coverings for Steam-Piping.\* W. N. Bolam and T. Grieve. (11) Aug. 7.  
 The Musker Steam Motor Wagon.\* (11) Aug. 7.  
 Economy of Fuel in Electric Generating Stations. Henry McLaren. (Paper read before the Inst. of Mech. Engrs.) (11) Aug. 7; (12) Aug. 7; (47) Aug. 15.  
 Theory of the Alcohol Motor. C. C. Longridge, M. I. Mech. E. (12) Aug. 7.  
 Compound Road Locomotives.\* (12) Aug. 7.  
 Electrically Driven Compressors for Drills, Coal-Cutters and Hauling Machinery.\* (22) Aug. 7.  
 The Gas Engine and Its Future. (26) Serial beginning Aug. 7.  
 The Valuation of Gas Coals. (24) Aug. 10.  
 Springs. Wm. Metcalf. (Paper read before the Amer. Soc. for Testing Materials.) (62) Serial beginning Aug. 13; (Abstract) (47) Aug. 8.  
 High Pressure Gas Distribution. John A. Britton. (Paper read before the Pacific Coast Gas Assoc.) (24) Aug. 17.  
 Wrought Pipe. Franklin Riffe. (Paper read before the Pacific Coast Gas Assoc.) (24) Aug. 17.  
 The Molding Machine.\* S. H. Stupakoff. (Paper read before the Amer. Foundrymen's Assoc.) (20) Aug. 13.  
 Chimney Draft. D. B. Dixon. (62) Aug. 13.  
 Exhaust Steam Turbines.\* (62) Aug. 13.  
 The Cruise Controllable Superheater.\* (11) Aug. 14.  
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 Mechanical Features in the Use of Superheated Steam. (40) Aug. 14.  
 A Concrete Measuring, Feeding and Mixing Plant. (14) Aug. 15.  
 A Combine! Railway, Lighting and Ice Plant at Hampton, Va.\* (14) Aug. 15.  
 The Manufacture and Utilization of Mond Producer Gas for Industrial Purposes.\* (19) Aug. 15.  
 Manufacture and Employment of Gas from Heavy Oil in Germany. (From the German of M. W. Scheibauer, in the *Journal für Gasbeleuchtung*.) (19) Aug. 15.  
 A Combined Exhaust Valve and Igniter for Gasoline Motors.\* (19) Aug. 15.

\* Illustrated.





**Mechanical—(Continued).**

- Extensions at the Evesham Gas Works: Purifiers without Connections.\* R. J. Milbourne, Assoc. M. Inst. C. E. (66) Aug. 18.
- Gaseous Firing at the Waterford Gas-Works.\* R. Bruce Anderson, Assoc. M. Inst. C. E. (Paper read before the Irish Assoc. of Gas Managers.) (66) Aug. 18.
- Laying a High Pressure Gas Main Across the Mississippi River at New Orleans.\* Thomas D. Miller. (Abstract of paper read before the Western Gas Assoc. (13) Aug. 20.
- Boiler and Furnace Efficiencies.\* A. Bement. (Abstract of Paper read before the National Electric Light Assoc.) (20) Aug. 20.
- The Power Required to Drive Centrifugal Machines.\* (11) Aug. 21.
- Malleable Cast Iron. R. Moldenke. (Paper read before the Amer. Foundrymen's Assoc.) (12) Aug. 21.
- Specifications for Beehive Coke Ovens.\* (22) Aug. 21.
- The West Allis Plant of the Allis-Chalmers Company.\* (14) Serial beginning Aug. 22.
- The Briquette Industry in France. Ed. Loze. (16) Serial beginning Aug. 22.
- The K. & G. Cube Concrete Mixers.\* (18) Aug. 22.
- Metallic Packings.\* Charles Longstreth. (From *Journal of the Amer. Soc. of Naval Engrs.*) (47) Aug. 22.
- Test of Engine Using Kerosene and Gasolene.\* H. F. Halladay and G. O. Hodge. (47) Serial beginning Aug. 22.
- Liquid Air: Its Manufacture, Distillation into Commercial Oxygen and Nitrogen, and the Application of Oxygen in the Industries, Especially for Use in Connection with Illuminating Gas. G. A. Bobrick. (Paper read before the Pacific Coast Gas Assoc.) (24) Aug. 24.
- Vertical Gas Retorts in America.\* (66) Aug. 25.
- Loss of Illuminating Power of Mantles While Burning. A. H. White and M. E. Mueller. (Paper read before the Michigan Gas Assoc.) (66) Aug. 25.
- Compressed Air for Raising Water from Deep Wells and Borings. W. H. Maxwell, Assoc. M. Inst. C. E. (From paper read before the British Assoc. of Water-Works Engrs.) (66) Aug. 25.
- The Efficiency of Concrete Mixing Machines.\* Clarence Coleman, M. Am. Soc. C. E. (13) Aug. 27.
- The Pittsburgh Fuel Saving Device.\* (20) Aug. 27.
- Drop Forging. Dwight Goddard. (Paper read before the Engineers' Soc. of Pennsylvania) (20) Aug. 27.
- An English Measuring Machine.\* (20) Aug. 27.
- Notes on High Speed Tool Steels. Henry H. Suplee. (62) Aug. 27.
- A New Spiral Elevator.\* (14) Aug. 29.
- Automatic Paper-Feeders for Printing Machinery.\* (46) Aug. 29.
- The Large Gas Engine in Great Britain: Blast Furnace Gas As a Factor in Its Development.\* William H. Booth. (10) Sept.
- Collapses of Furnace Crowns; a Suggested Explanation.\* H. M. Rounthwaite. (10) Sept.
- Machine Tools for Engine Building.\* George T. Reiss. (10) Sept.
- Motor-Driven Machine Tools—Recent Practice in the Application of Electric Drives to Drilling Machinery.\* (25) Sept.
- Boiler Corrosion—What Corrosion Is—Different Causes and Various Means by Which It May be Remedied or Prevented. (45) Sept.
- Stamp Cams and Cam-Shafts: A Description of the Different Forms of Cams and Methods of Fastening them to the Shaft.\* (45) Sept.
- Analyses and Fuel Value of the Pittsburg Coal in the Fairmount Region of West Virginia. Frank Haas. (45) Sept.
- Portland Cement Manufacture: Preparation of Dry Materials for the Kiln. Edwin C. Eckel. (60) Sept.
- A 6 000 Horse-Power Conover Jet Condenser.\* (64) Sept.
- The E. Keeler Company Water Tube Boiler.\* (64) Sept.
- Theory of Stiff and Flexible Shafts and Critical Speeds.\* Sanford A. Moss. (64) Sept.
- Measuring the Horse-Power of Steam Engines.\* E. C. Oliver. (64) Sept.
- Gas Engines at the Dusseldorf Exposition.\* R. Mathot. (64) Sept.
- The Use of Reheaters in Compound Engines.\* George H. Barrus. (Abstract of Paper presented to the New England Cotton Mfrs. Assoc.) (64) Sept.
- The Inland Steel Company's Indiana Harbor Works.\* (20) Sept. 3.
- A German Reversing Valve for Regenerative Furnaces.\* (20) Sept. 3.
- Etudes sur la Circulation de l'Eau dans les Chaudières à Vapeur.\* A. Montupet. (32) June.
- Le Broyeur à Vilebrequins Clérou.\* A. de Gennes. (32) July.
- Vérins Pneumatiques pour le Levage des Fardeaux.\* (34) Aug.
- Distribution de Vapeur.\* (34) Serial beginning Aug.
- L'Incandescence par le Gaz. Ch. Féry. (33) Aug. 8.
- Le Ballon Zeppelin.\* G. Espitalier. (33) Aug. 8.
- Fabrication Mécanique de Bouteilles.\* H. Aurive. (36) Aug. 10.
- Nouveaux Types de Surchauffeurs de Vapeur.\* (33) Aug. 15.
- Lucrerie de Ketzin, Pres de Berlin.\* (33) Aug. 22.
- Lampes pour Appareils de Projection à Incandescence par l'Alcool.\* A. Veroy. (36) Aug. 25.



**Metallurgical.**

- The Light Aluminum Alloys. Joseph W. Richards. (Paper read before the Amer. Soc. for Testing Materials.) (20) Aug. 13.
- The Influence of Varying Casting Temperature on the Properties of Alloys.\* Percy Longmuir. (Paper read before the Iron and Steel Inst.) (11) Serial beginning Aug. 14.
- The Detection of the Finishing Temperatures of Steel Rails by the Thermo-Magnetic Select or.\* Albert Sauveur and Jasper Whiting. (15) Aug. 14.
- The Manufacture and Properties of Nickel-Steel. Albert Ladd Colby. M. Am. Soc. M. E. (Abstract of paper read before the Amer. Soc. for Testing Materials.) (13) Aug. 20; (14) Serial beginning Aug. 22; (20) Aug. 20; (15) Aug. 14.
- Pipeless Ingots of the Sauveur Method.\* Albert Sauveur and Jasper Whiting. (Paper read before the Amer. Soc. for Testing Materials.) (62) Aug. 20; (47) Aug. 8; (15) Aug. 14.
- The Desulphurization of Slimes by Heap Roasting at Broken Hill. E. J. Horwood. (Abstract from *Transactions of the Australasian Inst. of Min. Engrs.*) (16) Aug. 22.
- Volatilization of Metals as Chlorides. Stuart Croasdale. (16) Aug. 29.
- Cyanidation at the Kalgurli Mine, Kalgoorlie.\* Edwin O. Watt. (Abstract from *Transactions of the Australasian Inst. of Min. Engrs.*) (16) Aug. 29.
- The Metallography of Iron and Steel.\* Henry M. Howe. (9) Sept.
- Roasting and Filter-Press Treatment at Kalgoorlie. J. T. Marriner. (16) Sept. 5.
- The Extraction of Gold from Cyanide Slimes by a Wet Method. John Fleming. (16) Sept. 5.
- Electro-Metallurgie du Zinc.\* A. Salguès. (32) July.
- Exposé des Dernières Expériences Industrielles Electro-Métallurgiques pour la Fonte de Minerais de Cuivre dans des Fours Électriques Réalisés en France. Ch. Vattier. (32) July.
- Essais Récents de Plaques Cémentées (1902-1903). L. Baclé. (33) Aug. 15.
- Recherches sur les Aciers au Manganese.\* Léon Guillet. (33) Serial beginning Aug. 22.

**Military.**

- The Richards Prismatic Stadia as a Range-Finder. E. K. Landis. (2) July.
- The Military Importance of Naval Engineering Experiments. George W. Melville. (2) July.
- The Topham Rifle Mechanism.\* (12) July 31.
- Military Graphics. Charles W. Larned. (44) Sept.-Oct.

**Mining.**

- Underground Fires. F. W. Hardwick, A. M. I. C. E. (Paper read before the British Fire Prevention Cong.) (57) July 31.
- New Methods of Filling in the Goaf in Germany.\* (From Report of Prussian Comm. on the Fall of Stone and Coal in Mines.) (22) Aug. 7; Aug. 21.
- Acetylene Lamps in German Collieries.\* (22) Aug. 14.
- Improved Appliances, &c., Introduced into German Mines in 1902.\* (From *Zeitschrift für Berg-, Hütten-, und Salinenwesen.*) (57) Serial beginning Aug. 14.
- Gold Mining and Milling in Ecuador.\* J. W. Mercer. (16) Aug. 15.
- Belt Elevators. (16) Aug. 15.
- Electric Power Appliances in the Mines of Europe.\* Emile Guarini. (9) Sept.
- Electric Coal-Mining Plants. S. B. Belden. (45) Sept.
- Traversing Winding Engine for Deep Shafts.\* H. M. Morgans. (Paper read before the Inst. of Min. and Metallurgy.) (45) Sept.
- Fatal Accidents in Coal Mines in North America, 1902. Frederick L. Hoffman. (16) Sept. 5.
- The Santa Eulalia Ore Deposits.\* Philip Argall. (16) Sept. 5.
- L'Emblayage Comme Méthode de Remblayage.\* H. Schmerber. (33) Aug. 8.

**Miscellaneous.**

- A Century's Progress in Engineering Education in the United States. Robert Heywood Fernald. (Paper read before the Engineers' Club of St. Louis.) (1) July.
- Mechanical Drawing in the Modern Drafting Room.\* George H. Follows. (58) July.
- Drawing Room Practice for Manufacturing Companies. J. L. Klindworth. (58) July.
- System in an Engineering Office. W. E. Fohl. (58) July.
- Instruments de Mesure de Haute Précision pour les Ateliers Mécaniques.\* A. Galassini. (37) July 31.

**Municipal.**

- Notes upon Municipal Work in Sydney, New South Wales. Richard Watkins Richards. M. Inst. C. E. (63) Vol. clii.
- Recent Developments of the Asphalt Industry. William Henry Delano. Assoc. Inst. C. E. (63) Vol. clii.
- The Use of Motor Vehicles for Municipal Purposes in England. (13) Aug. 13.
- Fire Patrol Service for Dock Property: Fire Preventive Methods at the Docks of the Manchester Ship Canal.\* W. H. Hunter. M. Inst. C. E. (Paper read before the International Fire-Prevention Cong.) (11) Aug. 21.
- Use of Mineral Oil in Road Improvement. James W. Abbott. (13) Aug. 27.
- Experiments on the Value of the Absorption Test for Paving Brick.\* (60) Sept.





**Railroads.**

- The Construction of the Lu-Pao District of the Lu-Han Railway.\* Thomas Johnstone Bourne, Assoc. M. Inst. C. E. (63) Vol. clii.
- Reduction of Grade on Railroads.\* C. D. Purdon. (Paper read before the Engineers' Club of St. Louis.) (1) July.
- Bogie Express Engines, Class D: South Eastern and Chatham Railway.\* (21) Aug.
- Interurban Railway Development in Great Britain. Robert P. Porter. (17) Serial beginning Aug. 8.
- Back Bay Station, Boston; New York, New Haven & Hartford Railroad.\* (18) Aug. 8.
- The Construction of the Simplon Tunnel.\* (13) Serial beginning Aug. 13.
- The Southern Pacific Shops at East Los Angeles.\* (15) Aug. 11.
- Grade Reduction on the Illinois Central.\* (15) Aug. 11.
- The Renovo Shops—Pennsylvania Railroad.\* (40) Aug. 14.
- Injectors on the Backhead of Locomotive Boilers.\* (40) Aug. 14.
- Plans of the Holland Sleeping Car.\* (17) Aug. 15.
- All Metal Box Cars on Mexican Railway.\* (18) Aug. 15.
- Drawbar and Buffer Attachments for Use between Engine and Tender. (18) Aug. 15.
- Electric Locomotives on French Railways.\* (19) Aug. 15.
- Shops of the Locomotive & Machine Company of Montreal.\* (15) Aug. 21.
- Heavy Electric Locomotive for the B. & O.\* (15) Aug. 21; (17) Aug. 22; (27) Aug. 22; (40) Aug. 24.
- German Locomotive Designs for High Speed Service.\* Lawford H. Fry. (15) Aug. 21.
- The Life of Treated Ties.\* (15) Aug. 21.
- The New Rock Island Shops at East Moline, Ill.\* (40) Aug. 21.
- The New Baltimore & Ohio Electric Locomotive.\* (14) Aug. 22.
- New General Shops of Chicago & Eastern Illinois Ry.\* (18) Aug. 22.
- The Hudson River Tunnel.\* (46) Aug. 22.
- Sectional Electric Locomotives for the Baltimore Tunnel of the Baltimore & Ohio Ry.\* (13) Aug. 27.
- The Inspection of Rails. C. W. Gennet, Jr. (15) Aug. 28.
- The Illinois Central Improvements—New Lines and Second Track.\* (15) Aug. 28.
- The Care of Locomotive Boilers. M. E. Wells. (Abstract of Paper presented to the Pacific Coast Ry. Club.) (15) Aug. 28.
- Northern Pacific Consolidation Locomotive.\* (40) Aug. 28.
- Concrete Roundhouse and Freight Depot.\* (40) Aug. 28.
- Central Railroad of New Jersey Composite Box Car.\* (40) Aug. 28.
- The Moll Switch Rod and Adjustable Clamp.\* (40) Aug. 28.
- The Utica & Mohawk Valley Railway.\* (17) Aug. 29.
- Fonda, Johnstown and Gloversville System.\* (17) Aug. 29.
- The Albany and Hudson Third-Rail System. (17) Aug. 29.
- The Tools and Methods of a Swiss Locomotive Works.\* Charles R. King. (10) Sept.
- The Railway Town of Crewe: The Home of the London & North-Western Railway Works.\* Charles S. Lake. (10) Serial beginning Sept.
- Compound Locomotive with Superheater: 4-6-0 Type, Freight: Canadian Pacific Railway.\* (25) Sept.
- New Locomotive Shops at Topeka—Atchison, Topeka & Santa Fé Railway.\* (25) Serial beginning Sept.
- The Shedy Circulating Pipe for Locomotive Cylinders.\* (25) Sept.
- Revoluble Car-Dumping Structure.\* Erskine Ramsay. (45) Sept.
- Steel Cars of the Side-Door Type for Suburban Traffic; Illinois Central R. R.\* (13) Sept. 3; (15) Sept. 4.
- Power Plant of the Pittsburg, McKeesport & Connellsville Railway.\* (14) Sept. 5.
- Erection of the Atlantic Avenue Improvement Viaduct, Brooklyn.\* (14) Sept. 5.
- Des Gares de Raccordement entre Chemins de Fer & Voies Navigables sur les Canaux de Roanne à Digoin Latéral à la Loire et du Nivernais.\* M. Mazoyer. (43) 1er Trimestre.
- Emploi d'Enclenchements Provisoires dans les Grandes Gares Pendant les Périodes de Détélement des Cabines à l'Occasion de Travaux d'Aggrandissement ou de Remaniement d'Installations Existantes: Dispositions de Réseaux Funiculaires pour Réaliser les Enclenchements Provisoires en Cabine.\* M. Moutier et M. Sabourin. (38) Aug.
- Étude sur la Statistique des Avaries et Ruptures d'Essieux du Matériel des Chemins de Fer de l'Union Allemande. E. Beud. (38) Aug.
- Station Centrale d'Énergie Électrique de Batavia, États-Unis.\* (Aurora, Elgin & Chicago Ry.) (33) Aug. 1.
- Locomotives Compound à Trois Cylindres de la Compagnie du Midland.\* R. Bonnin. (33) Aug. 8.
- Applications de l'Électricité aux Chemins de Fer.\* B. Lorey. (36) Serial beginning Aug. 10.
- Éclairage des Voitures de Chemins de Fer au Moyen de l'Incandescence par le Gaz.\* (33) Aug. 22.
- Automotrice à Vapeur de la Compagnie du Chemin de Fer du London and South Western.\* R. Bonnin. (36) Aug. 25.

**Railroad, Street.**

- Notes on the Construction of the Permanent Way of Electric Tramways.\* Robert Bruce, Stud. Inst. C. E. (63) Vol. clii.
- Lowestoft Municipal Electrical Tramways.\* (26) Aug. 7.



**Railroad, Street—(Continued).**

- Notes on the Denver City Tramway System.\* (17) Aug. 8.  
 Carriage of Merchandise on Electric Tramways. Thomas Upton. (26) Serial beginning Aug. 14.  
 Motor Trucks for the New York Subways.\* (17) Aug. 15.  
 Electric Tramways of Sydney (N. S. W.) Extensions.\* (26) Aug. 21.  
 Section Nine of Division Three of the New York Rapid Transit Railroad.\* (14) Serial beginning Aug. 22.  
 Details of Construction of the Paris Underground Railway beneath the Place de l'Opera.\* (19) Aug. 22.  
 The Interurban System of the South Lancashire Tramways.\* (17) Aug. 22.  
 Cars for the New York Subway.\* (17) Aug. 22.  
 London's "Tubes"—The Novel Method of Their Construction.\* (19) Aug. 22.  
 High-Acceleration on Electric Railways: Results on the Liverpool Overhead Line. Herbert C. Fyfe. (19) Aug. 22.  
 Modern Repair Shop Methods.\* Richard McCulloch. (17) Aug. 29.  
 The Hudson Valley Railway.\* (17) Aug. 29.  
 United Traction System of Albany.\* (17) Aug. 29.  
 Schenectady's City, Suburban and Interurban Electric Railway Facilities.\* (17) Aug. 29.  
 Power Equipment for City Roads.\* (17) Aug. 29.  
 Standard Practice in City Track Construction.\* (17) Aug. 29.  
 Standard Overhead Construction in City Streets.\* (17) Aug. 29.  
 Standard Practice in Rolling Stock for City Service.\* (17) Aug. 29.  
 Electric Traction in Sydney, New South Wales.\* Arthur C. F. Webb, M. I. E. E. (27) Aug. 29.  
 Schuckert Surface-Contact Street Railway System.\* S. N. Taylor. (27) Aug. 29.  
 The Metropolitan Underground Railway of Paris: Construction of the North Circle.\* (13) Sept. 3.  
 Report of the New York Rapid Transit Commissioners.\* (15) Sept. 4.  
 Matériel Roulant du Manhattan Railway.\* Henry Martin. (33) Aug. 1.

**Sanitary.**

- The High-Level Sewer of the Metropolitan Sewerage District of Massachusetts.\* John S. Hodgson. (14) Serial beginning Aug. 15.  
 Street Cleaning in San Francisco. L. M. King. (From a paper in the *Merchants' Association Review*.) (13) Aug. 20.  
 On the Distribution of Sewage on Bacteria Beds. John C. Thresh and Martin Priest. (Paper read before the Sanitary Inst.) (11) Aug. 21.  
 Sewage Pumping Plant.\* (12) Aug. 21.  
 Heating and Ventilating the Shops and Offices of the Pennsylvania Steel Company.\* (40) Aug. 21.  
 Infiltration of Ground Water Into Sewers. J. N. Hazlehurst, M. Am. Soc. C. E. (13) Aug. 27.  
 Cleaning a Large Brick Sewer in Hartford, Conn. Frederick L. Ford, Assoc. M. Am. Soc. C. E. (From *Bulletin of the Connecticut Soc. of Civ. Engrs.*) (13) Aug. 27.  
 A Large Concrete-Steel Sewer (Cleveland).\* (14) Aug. 29.  
 La Nouvelle Usine d'Incinération des Immondices de la Ville de Bruxelles: Note. J. Leurs. (30) Aug.  
 Les Avantages et les Inconvénients des Égouts du Système Unitaire et du Système Séparatif. (33) Aug. 15.

**Structural.**

- Recent Developments of the Asphalt Industry. William Henry Delano, Assoc. Inst. C. E. (63) Vol. clii.  
 Nickel Steel for Purposes of Construction. Ralph H. Watson. (58) June.  
 Protective Coatings for Iron and Steel. (Report of Committee of Amer. Soc. for Testing Materials.) (40) Aug. 14.  
 Soundness Tests of Portland Cement.\* (Abstract of Paper by W. P. Taylor before Amer. Soc. for Testing Materials and of discussion by Robert W. Lesley.) (14) Aug. 15.  
 Manufactured Marble. (19) Aug. 15.  
 Standard Test Bars for Cast Iron. Alex. E. Outerbridge, Jr. (Paper read before the Amer. Soc. for Testing Materials.) (47) Aug. 15.  
 The Manufacture and Properties of Nickel-Steel. Albert Ladd Colby, M. Am. Soc. M. E. (Abstract of Paper read before the Amer. Soc. for Testing Materials.) (13) Aug. 20; (14) Serial beginning Aug. 22; (20) Aug. 20; (15) Aug. 14.  
 The Works of the Lackawanna Steel Company.\* (22) Aug. 21.  
 The Practical Protection of Metal Surfaces in Gas Plants. L. P. Lowe. (Paper read before the Pacific Coast Gas Assoc.) (24) Aug. 24.  
 The Manufacture and Properties of Hydrate of Lime. S. Y. Brigham. (13) Aug. 27.  
 The Efficiency of Concrete Mixing Machines.\* Clarence Coleman, M. Am. Soc. C. E. (13) Aug. 27.  
 Auxiliary Pneumatic Caisson Work for the Bank of the State of New York.\* (14) Aug. 29.  
 Concrete House Building.\* (46) Aug. 29.  
 The Uses of Concrete in Recent Engineering Practice. Samuel H. Lea, M. Am. Soc. C. E. (Paper read before the Scranton Engineers' Club.) (45) Sept.



**Structural—(Continued).**

- The Influence of Variations in Water and Sand on Cement. E. S. Larned. (Paper read before the Amer. Soc. for Testing Materials.) (14) Sept. 5.  
 A New System of Seasoning Wood with Saccharine or Sugar. (19) Sept. 5.  
 La Métallographie Microscopique et Son Utilisation Comme Méthode d'Essais. Léon Guillet. (32) July.

**Topographical.**

- The Richards Prismatic Stadia as a Range-Finder. E. K. Landis. (2) July.  
 The Hammer-Fennel Instrument for Stadia Work.\* Horace Andrews, M. Am. Soc. C. E. (13) Aug. 14.  
 The Standard and Its Use in Surveying.\* Edward Riordan. (13) Aug. 27.  
 Military Graphics. Charles W. Larned. (44) Sept.-Oct.

**Water Supply.**

- Burrage Dam and Water-Supply for the Lloyd Copper Company's Mine, New South Wales.\* John Haydon Cardew, Assoc. M. Inst. C. E. (63) Vol. clii.  
 The Cauvery Power-Transmission Scheme. Harold Thornthwaite Hincks, Assoc. M. Inst. C. E. (63) Vol. clii.  
 Improvement, Extension and Filtration of the Water-Supply of Philadelphia.\* John W. Hill. (2) July.  
 The Gas Engine as a Pumping Medium. D. Hastings Irwin. (Paper presented before the British Assoc. of Water-Works Engrs.) (66) Aug. 4.  
 Description of a New Water-Pipe Scraping Machine. C. Clemesha Smith, Assoc. M. Inst. C. E. (Abstract of Paper read before the British Assoc. of Water-Works Engrs.) (66) Aug. 4.  
 Protection of Gathering-Grounds and Filtration Compared. S. Delépine. (Abstract of Paper read before the British Assoc. of Water-Works Engrs.) (66) Aug. 11.  
 A Mexican Water-Power Electric Plant.\* (13) Aug. 13.  
 Masonry and Steel Head-Gate of the Grand Valley Irrigation Canal, Colorado.\* Clarence T. Johnston. (13) Aug. 13.  
 Experience with Anchor Ice at the Detroit Water-Works and Elsewhere. C. W. Hubbell, Assoc. M. Am. Soc. C. E. (From the *Michigan Technic.*) (13) Aug. 13.  
 The Raising of Water from Deep Wells and Borings by Compressed Air.\* William H. Maxwell, Assoc. M. Inst. C. E. (Paper read before the British Assoc. of Water-works Engrs.) (12) Aug. 14.  
 Drainage of Irrigated Lands. Ernest McCullough. (13) Aug. 20.  
 The Water-Works of Atlantic City. (14) Aug. 22.  
 A Concrete-Steel Water Tower near Boston. (14) Aug. 22.  
 Surveys for Electrolysis and Their Results. D. H. Maury, M. Am. Soc. C. E. (Abstract of Paper read before the Amer. Water-Works Assoc.) (47) Aug. 22.  
 The Staines Reservoirs (London Water-Works.)\* (66) Aug. 25.  
 A Mechanical Filter Plant for the Ithaca Water-Works Company.\* (14) Aug. 29.  
 Independent Water-Power Development.\* (17) Aug. 29.  
 Tangential Water-Wheel Efficiencies.\* (27) Aug. 29.  
 The Method of Operation of the Philadelphia Filtration Plant.\* William B. Bray. (60) Sept.  
 The Water-Works of Pontiac, Mich.\* (14) Sept. 5.  
 Depreciation, as Applied to Water-Works. John W. Alvord. (Paper read before Amer. Water-Works Assoc.) (14) Serial beginning Sept. 5.  
 Les Eaux Alimentaires de l'Agglomération Bruxelloise en 1903.\* A. Deblon. (30) Aug

**Waterways.**

- The Nile Reservoir, Assuan, Maurice Fitzmaurice, M. Inst. C. E. (63) Vol. clii.  
 Sluices and Lock-Gates of the Nile Reservoir, Assuan.\* Frederick Wilfrid Scott Stokes, M. Inst. C. E. (63) Vol. clii.  
 The Düsseldorf Navigation Congress, 1902; and Works Visited by the Congress in Germany.\* Leveson Francis Vernon-Harcourt, M. Inst. C. E. (63) Vol. clii.  
 The Obstruction of the Navigation of Southern Rivers by the Growth of the Water Hyacinth. L. Y. Schermerhorn. (2) July.  
 The Bush Docks in Brooklyn.\* (18) Aug. 15.  
 Waterway Improvement on the Ohio.\* William Gilbert Irwin. (46) Aug. 15.  
 Methods of Measuring Velocity in River Channels.\* H. A. Pressey. (19) Sept. 5.  
 Des Gares de Raccordement entre Chemins de Fer & Voies Navigables sur les Canaux de Roanne à Digoin Latéral à la Loire et du Nivernais.\* M. Mazoyer. (43) 1<sup>er</sup> Trimestre.  
 IX<sup>e</sup> Congrès International de Navigation: Comptes Rendus des Délibérations du Congrès. (43) 1<sup>er</sup> Trimestre.  
 Des Éléments Constitutifs d'une Voie Navigable Considérés au Point de Vue de Sa Capacité de Fréquentation et de l'Utilisation du Matériel de Batellerie.\* Gustave Cadart et L. Barbet. (43) 1<sup>er</sup> Trimestre.  
 Le Sénégal et le Port de Dakar.\* G. Espitallier. (33) Aug. 15.

\* Illustrated.





## AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1852.

## PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

## SOCIETY AFFAIRS.

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## MINUTES OF MEETINGS.

## OF THE SOCIETY.

**October 7th, 1903.**—The meeting was called to order at 8.50 P.M., President Noble in the chair; Chas. Warren Hunt, Secretary; and present, also, 90 members and 10 guests.

The minutes of the meetings of September 2d and 16th, 1903, were approved as printed in *Proceedings* for September, 1903.

Messrs. Alfred W. Trotter, F. F. Harrington and Arthur S. Tuttle were appointed tellers to canvass the ballot on the proposed amendment to the Constitution.

A paper entitled "South African Irrigation," by Francis Robert Johnson, M. Am. Soc. C. E., was presented by the Secretary.

The tellers appointed to canvass the ballot on the proposed amendment to the Constitution\* reported as follows:

Total ballots received .....	616
Without signature. ....	3
Not entitled to vote.....	10
Otherwise defective.....	17
	— 30
Total votes counted.....	586
Voted "yes".....	537
Voted "no".....	49
	— 586

The President declared the amendment adopted.

E. L. Corthell, M. Am. Soc. C. E., addressed the meeting informally, and described certain commercial, agricultural and engineering features of the Argentine Republic.

Ballots for membership were canvassed, and the following candidates elected:

#### AS MEMBERS.

CHARLES ALBERTSON, Kobe, Japan.  
 FREDERICK WAGONER BENNETT, Guayaquil, Ecuador.  
 WILLIAM LEWIS BRECKINRIDGE, Chicago, Ill.  
 FREDERICK ANDERSON BURDETT, New York City.  
 EDWARD PONTANY BUTTS, Holyoke, Mass.  
 ALBERT CARR, New York City.  
 ALBERT LADD COLBY, South Bethlehem, Pa.  
 WILLIAM WEEDEN COLE, Elmira, N. Y.  
 FRED STEERE DARLING, Montreal, Que., Canada.  
 SAMUEL BROWNLEE FISHER, St. Louis, Mo.  
 WILLIAM JOHNSON HARAHAN, Chicago, Ill.  
 BENJAMIN HURT HARDAWAY, Columbus, Ga.  
 CHAPMAN LOVE JOHNSON, Tomhannock, N. Y.  
 ANSON MARSTON, Ames, Iowa  
 DONALD ALEXANDER MATHESON, Glasgow, Scotland.  
 FRANK MOBERLY, Victoria, B. C., Canada.  
 MASON MATHEWS PATRICK, Washington, D. C.  
 HENRY WILLIS POST, New York City.  
 FREDERICK PERRY SHEARWOOD, Montreal, Que., Canada.  
 SAMUEL ALFRED TAYLOR, Pittsburg, Pa.  
 SELWYN MELLON TAYLOR, Pittsburg, Pa.  
 EDWARD BAYLIES THORNHILL, London, England.  
 ROSS FRANCIS TUCKER, New York City.  
 CARL UHLIG, San Francisco, Cal.

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\* See *Proceedings*, for August, 1903, p. 195.

EDWIN FREDERICK WENDT, New Brighton, Pa.  
JOHN T. WHISTLER, Washington, D. C.  
FRANK WILCOX, Pittsburg, Pa.  
CHAUNCEY GRANT WILLIAMS, Brooklyn, N. Y.

AS ASSOCIATE MEMBERS.

GEORGE MARSHALL BEERBOWER, New York City.  
HERBERT AUGUSTINE CRESSWELL, Perth, Western Australia.  
JOHN MILLER CUNNINGHAM, Pittsburg, Pa.  
CHARLES DAVIS DREW, Cambridge, Mass.  
FREDERICK ELBERT FIELD, Pittsburg, Pa.  
WILLIAM LEONARD GLAZIER, Newport, Ky.  
ALBERT WORTHINGTON HANKINSON, New York City.  
ROBERT GRAHAM HENGST, Chicora, Pa.  
ENGBERT A LEE, Denver, Colo.  
ELMER GOVE MANAHAN, Paterson, N. J.  
GUY ROBERT RAMSEY, Ensley, Ala.  
SAMUEL PALMER SENIOR, Bridgeport, Conn.  
MACKEY JAMES THOMPSON, La Crosse, Wis.  
SETH MORTON VAN LOAN, Philadelphia, Pa.  
CHARLES AUSTIN WENTWORTH, Brooklyn, N. Y.  
WILLIAM PHARO WILTSEE, Kenova, W. Va.

The Secretary announced the election of the following candidates by the Board of Direction, on October 6th, 1903:

AS ASSOCIATES.

FREDERICK SNARE, New York City.  
FREDERICK WILCOCK, Brooklyn, N. Y.

AS JUNIORS.

KENNETH MACKENZIE CAMERON, Montreal, Que., Canada.  
CÉSAR CASTELLANOS, Comitán, Chiapas, Mexico.  
KENNETH FARRA COOPER, San José, Cal.  
MILES PENNER COTTON, Winnipeg, Man., Canada.  
DAVID MARK DULLER, Lake Charles, La.  
E. ALBERT GAST, Cincinnati, Ohio.  
ROBERT WALTER GAY, Bayonne, N. J.  
CHARLES EDWARD GILMAN, San Francisco, Cal.  
HARRY TODD GRISWOLD, Roxbury, Mass.  
HARRY LEWIS HAEHL, Coyote, Cal.  
HENRY SYDNEY HANCOCK, Jr., Newkirk, Okla.  
WALTER SCOTT HANNA, Boston, Mass.

HENRY PEREZ HOYT, Millinocket, Maine.  
MARK LORIN IRELAND, Washington, D. C.  
WILLIS ROBERT JORDAN, Cleveland, Ohio.  
CLAUDE EAGLESON KEENE, McComas, W. Va.  
SOL McCORRY, Charleston, Ill.  
RAY MURRAY, Philadelphia, Pa.  
GEORGE ISRAEL OAKLEY, East Williston, N. Y.  
WALTER JOHN PLOGSTED, Buffalo, N. Y.  
ARMOUR CANTRELL POLK, New York City.  
WILLIAM STANTON ROOT, New York City.  
VICENTE SAUCEDO, Saltillo, Coahuila, Mexico.  
WILBUR CYRUS SAWYER, Essex Junction, Vt.  
FRANCIS RAUCH SCHMID, Bethlehem, Pa.  
FREDERICK AUGUSTUS SHERWOOD, Germantown, Pa.  
CHARLES HEYWOOD STRATTON, Annapolis, Md.  
JAMES WOLFE SUSSEX, Newark, N. J.  
DAVID YOUNGS SWATY, Pittsburg, Pa.  
NORMAN ALFRED TAYLOR, Troy, N. Y.  
WHITMELL PUGH TUNSTALL, Cleveland, Ohio.  
HENRY RADCLYFFE ST. ARVANS WALTERS, Bethlehem, Pa.  
ROYAL SYLVESTER WEBSTER, Kansas City, Mo.  
FREDERICK WHITEFIELD WITHERELL, Pittsburg, Pa.

Adjourned.

**October 21st, 1903.**—The meeting was called to order at 8.40 P. M., President Noble in the chair; Chas. Warren Hunt, Secretary; and present, also, 103 members and 14 guests.

A paper entitled "Some Railway Construction in Oklahoma," by A. G. Allan, Assoc. M. Am. Soc. C. E., was presented by the Secretary, who also read communications on the subject from Messrs. Samuel H. Lea and Emile Low.

A second paper, entitled "The Fatigue of Cement Products," by J. L. Van Ornum, M. Am. Soc. C. E., was presented by the Secretary, who also read communications on this subject from Messrs. L. F. Bellingier, E. R. Buckley and A. L. Johnson.

The Secretary announced the death of CHARLES EZRA GREENE, elected Member January 4th, 1882; died October 17th, 1903.

Adjourned.



## OF THE BOARD OF DIRECTION.

(Abstract.)

**October 6th, 1903.**—President Noble in the Chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Briggs, Craven, Croes, Knap, Osgood, Pegram and Schneider.

William Jackson, Joseph P. Davis and Charles S. Gowen were appointed a Committee to prepare a memoir of the late Alphonse Fteley, Past-President, Am. Soc. C. E.

E. Gerber, H. G. Prout and C. C. Schneider were appointed a Committee to prepare a memoir of the late George S. Morison, Past-President, Am. Soc. C. E.

Charles Macdonald, William Metcalf and J. A. Ockerson, were appointed as Honorary Members (representing this Society) of the American Reception Committee of the Iron and Steel Institute in 1904.

Applications were considered and other routine business transacted.

Two candidates for admission as Associate and thirty-four as Junior were elected.\*

Adjourned.

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\*See page 375.

## ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

## MEETINGS.

**Wednesday, November 4th, 1903.**—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper by Eugene Goetze, Esq., entitled "Filtration for Public Water Supplies, with Especial Reference to the Double Filtration Plant at Bremen, Germany," will be presented for discussion.

This paper was printed in *Proceedings* for September, 1903.

**Wednesday, November 18th, 1903.**—8.30 P. M.—At this meeting a paper by George Cecil Kenyon, Assoc. M. Am. Soc. C. E., entitled "Dock Improvements at Liverpool," will be presented for discussion.

This paper was printed in *Proceedings* for September, 1903.

**Wednesday, December 2d, 1903.**—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper, entitled "A Desirable Method of Dredging Channels through River Bars," by S. Maximoff, Assoc. M. Am. Soc. C. E., will be presented for discussion.

This paper is printed in this number of *Proceedings*.

## ANNUAL CONVENTION, 1904.

The Thirty-sixth Annual Convention will be held at St. Louis, Mo., during the week beginning October 3d, 1904.

This week has also been fixed for an International Engineering Congress, to be held under the auspices of a Committee appointed by the Exposition authorities, upon the recommendation of this Society.

It is also expected that the visit of members of the Institution of Civil Engineers to this country, by invitation of this Society, will be so timed that their participation in the International Engineering Congress will be assured.

As the details of the above matters are developed, they will be announced in *Proceedings*.

## INTERNATIONAL ENGINEERING CONGRESS.

The following Committee, recommended by the Board of Direction of this Society, has been appointed by the President of the Universal Exposition, St. Louis, 1904, to take charge of an International Engineering Congress to be held at St. Louis during the week beginning October 3d, 1904:

HENRY S. HAINES, M. Am. Soc. C. E.	New York, N. Y.,	<i>Chairman.</i>
L. F. G. BOUSCAREN, “	“	Cincinnati, O., <i>Vice-Chairman.</i>
WILLIAM METCALF, “	“	Pittsburg, Pa.
BENJAMIN M. HARROD, “	“	New Orleans, La.
WILLIAM P. CRAIGHILL, “	“	Charlestown, W. Va.
M. T. ENDICOTT, “	“	Washington, D. C.
E. L. CORTHELL, “	“	New York, N. Y.
JOSEPH RAMSEY, JR., “	“	St. Louis, Mo.
ROBERT W. HUNT, “	“	Chicago, Ill.
L. B. STILLWELL, “	“	New York, N. Y.
A. A. ROBINSON, “	“	St. Louis, Mo.
GEORGE B. POST, “	“	New York, N. Y.
M. L. HOLMAN, “	“	St. Louis, Mo.
PALMER C. RICKETTS, “	“	Troy, N. Y.
JOSEPH M. KNAP, “	“	New York, N. Y., <i>Treasurer.</i>
CHAS. WARREN HUNT “	“	New York, N. Y., <i>Secretary.</i>

## UNIVERSAL EXPOSITION, ST. LOUIS, 1904.

The Society has undertaken to provide for an Engineering Exhibit, and the establishment of Headquarters for visiting engineers, and the Board of Direction has appropriated sufficient funds to defray the necessary expense.

This matter is in the hands of the following Committee:

ROBERT MOORE, M. Am. Soc. C. E.,	St. Louis, Mo.,	<i>Chairman.</i>
EDWARD C. CARTER, M. Am. Soc. C. E.,	Chicago, Ill.	
MORDECAI T. ENDICOTT, M. Am. Soc. C. E.,	Washington, D. C.	
JAMES L. FRAZIER, “	“	Frankfort, Ind.
WILLIAM JACKSON, “	“	Boston, Mass.
EMIL KUICHLING, “	“	New York, N. Y.
JOHN F. WALLACE, “	“	Chicago, Ill.
H. J. PFEIFER, Assoc. M. Soc. Am. C. E.,	St. Louis, Mo.,	<i>Secretary.</i>

**LIST OF NOMINEES FOR THE OFFICES TO BE FILLED AT  
THE ANNUAL ELECTION, JANUARY 20, 1904.**

The following list of nominees for the offices to be filled at the Annual Meeting, January 20th, 1904, received from the Nominating Committee, was presented to the Board of Direction at its meeting on September 1st, 1903. The list has already been mailed to all Corporate Members.

*For President, to serve one year :*

CHARLES HERMANY, Louisville, Ky.

*For Vice-Presidents, to serve two years.*

F. S. CURTIS, Boston, Mass.

S. L. F. DEYO, New York City.

*For Treasurer, to serve one year:*

JOSEPH M. KNAP, New York City.

*For Directors, to serve three years:*

N. P. LEWIS, New York City, representing District No. 1.

CHARLES S. GOWEN, Ossining, N. Y., representing District No. 1.

JOHN W. ELLIS, Woonsocket, R. I., representing District No. 2.

GEORGE S. WEBSTER, Philadelphia, Pa., representing District No. 4.

RALPH MODJESKI, Chicago, Ill., representing District No. 5.

CHARLES D. MARX, Santa Clara, Cal., representing District No. 7.

## ACCESSIONS TO THE LIBRARY.

From September 9th to October 13th, 1903.

## DONATIONS.\*

## THE ALTERNATING CURRENT TRANSFORMER.

By F. G. Baum. Cloth, 8 x 6 ins., 95 pp., illus. New York, McGraw Publishing Company, 1903. \$1.50.

This book, as is stated in the preface, originated in a course of university lectures. It is intended for the general reader as well as the engineer. Some knowledge of elementary alternating currents is presupposed. Chapters I and II are introductory. Chapters III to V are intended to impart a knowledge of the transformer. The tests in Chapter VI are to be carried out by the student on a few commercial types. The chapter headings are: Elementary Principles; Simple Transformer Diagram; Graphical Representation of Pressure Relations; Regulation; Efficiency; Testing; Systematic Design; Circuit Regulators, Constant Current Transformers, Series Transformers, Compensating Voltmeter; Connections of Transformers for Single-phase and Polyphase Circuits; Commercial Types of Transformers; Extracts from Rules and Requirements of the National Board of Fire Underwriters. There is an index of seven pages.

## COMPOUND CORLISS ENGINES.

By James Tribe, M. Am. Soc. M. E. Leather, 7½ x 5 ins., 177 pp., illus. Published by the Author, Milwaukee, Wis. \$2.50.

The author states in the preface that this volume was intended as the second edition of his former work "Compound Engines," but so much new material has been added and so thorough has been the revision of the old, that it has become a new book. In its present form it is an elementary text-book on the generation and utilization of heat and the transformation of heat energy into mechanical energy by means of the multi-cylinder Corliss steam engine. The work aims to be practical in purpose, all the examples being based upon actual practice, and the data taken from engines which are built and running. It is intended to meet the needs of the steam engine designer whose knowledge of higher mathematics may be limited, and who finds himself handicapped by the usual complex formulas. The Contents are: Preliminary Investigation; Steam; Water for Steam; Heat-Energy; Economy of Expansion; Theoretical Diagrams; Horse Power as a Standard Measurement for Work; Multiple Expansion; Steam Jackets; Single-Cylinder Engines; Double-Expansion Non-Condensing Engines; Double-Expansion Condensing Engines; Double-Expansion Pumping Engines; Triple-Expansion Engines; Quadruple-Expansion Engines; Receivers; Condensing Apparatus; Injection Water. There is an index of two pages.

## ENGINEERING PRELIMINARIES FOR AN INTERURBAN ELECTRIC RAILWAY.

By Ernest Gonzenbach. Cloth, 9 x 6 ins., 71 pp., illus. New York, McGraw Publishing Company, 1903. \$1.00.

In view of the present interest in interurban railway development and engineering the author submits, as the result of an invitation from the *Street Railway Journal*, the plans and recommendations embodied in a report on a proposed railway in the Middle West which serves as an example of the many roads now on paper, and which may soon assume tangible form. The book is not intended by the author as an attempt to generalize and instruct others in the art of railway construction, but is to show the way in which certain conditions were to be met in a certain case, together with the reasons which led to the recommendations and plans therein submitted. The Contents are: Introductory; Estimated Income; General Requirements; Third Rails, Trolley; Location; Roadbed and Track; Rolling Stock; Electric Car Equipment; Car Shops; Power Stations; Transmission Line; Distributing System; Third Rail; Accessories; Estimate of Operation; General Conclusions.

## PRACTICAL HYDROSTATICS AND HYDROSTATIC FORMULAS.

By E. Sherman Gould, M. Am. Soc. C. E. Cloth, 6 x 4 ins., 114 pp., illus. New York, D. Van Nostrand Company, 1903. 50 cents.

The preface states that the object of this little treatise is to set forth clearly the fundamental laws of hydrostatics by which all practical problems may be readily solved, and to supplement them by a large number of deduced formulas embracing a wide

\* Unless otherwise specified, books in this list have been donated to the Library by the Publishers.



range of application, the whole being made plain by an abundance of illustrative figures and numerical examples. The treatment of the subject includes the calculation of the buoyant effect of water upon immersed bodies. The Contents are: General Principles; Physical Properties of Water; Transmission of Water Pressure; General Law of Hydrostatic Pressure; Inclined Surfaces; Horizontal Thrust and Vertical Downward Pressure; Hydrostatic Paradox; Hydraulic Press; Special Cases of Hydrostatic Pressure; Examples for Practice; The Centre of Pressure; General Law for the Centre of Pressure; Centre of Pressure on Inclined Surfaces; General Formula; Practical Importance of the Position of the Centre of Pressure; Special Problems; General Principles; Law of Archimedes; Practical Application of the Law of Archimedes; General Law of Buoyancy.

#### MECHANICAL REFRIGERATION.

Being a Practical Introduction to the Study of Cold Storage, Ice-Making, and other Purposes to which Refrigeration is Being Applied. By Hal Williams, A. M. I. Mech. E., A. M. I. E. E. Cloth, 8 x 5 ins., 13 + 406 pp., illus. Whittaker & Co., London and New York, 1903. \$2.25. (Donated by The Macmillan Company.)

In writing this book, the author has endeavored to confine himself to the practical issues rather than the purely technical, and thus to deal comprehensively with the questions of insulation, ice-making and cold storage from the standpoint of the owner and user. The Introduction explains the general principles of mechanical refrigeration, and is followed by two chapters on The Laws of Heat, Fluids, Liquids, Gases and Vapors and Thermo-Dynamics and Entropy. The next three chapters explain and describe Refrigerating Machines and are followed by chapters on the Refrigerating Plant; Auxiliary Plant; Insulation; Brine; Distilled Water; Ice-Making; Cold Storage; Articles in Cold Storage; Other Applications. This last chapter describes the application of refrigeration to the Brewery, the Dairy, etc. There is an index of seven pages.

#### IRON, STEEL, AND OTHER ALLOYS.

By Henry Marion Howe. Cloth, 9 x 6 ins., 18 + 457 pp., illus. Sauveur & Whiting, Boston, 1903. \$5.00.

The preface states that this work was undertaken originally for the use of the author's students, to supplement the instruction given by lectures and other books. This it aimed to do by elaborating certain matters which are not treated at length, if at all, in other text books. The fact of writing a book fitted for students was an opportunity to go a little farther and try to meet the needs of practitioners, by giving them an account of the condition of the metallography of iron to-day, and more particularly to expose to them the present or solution theory of that metallography. The chapter headings are: Introductory; Cooling Curves; Freezing Point Curves; Constitution of Binary Alloys which Form no Definite Chemical Compound; Other Series Curves of Binary Alloys Forming no Chemical Compound; Cooling Curves and Freezing-Point Curves of Series Containing Definite Chemical Compounds; Variations in Electric Conductivity and other Properties of Series of Alloys; The Metallography of Iron and Steel; The Heat-Treatment of Steel and Cast Iron; The Phase Rule; Progress in the Manufacture of Iron and Steel between 1880 and 1900; The Blast-Furnace; Metallurgical Gas Furnaces; Appendix. There is an index of seventeen pages.

#### THE MECHANICAL ENGINEER'S POCKET-BOOK OF TABLES, FORMULÆ RULES AND DATA.

A Handy Book of Reference for Daily Use in Engineering Practice. By the late D. Kinnear Clark, M. Inst. C. E. Fifth Edition, Revised throughout and Enlarged by H. H. P. Powles, M. I. M. E., A. M. Inst. C. E. Leather, 6 x 4 ins., 32 + 692 pp., illus. New York, D. Van Nostrand Company, 1903. \$3.00.

This pocket-book has been prepared for the purpose of shortening the calculations and other intricate mental operations which are among the daily recurring needs of mechanical men. To meet such needs, there will be found about 350 tables of results of calculations relating to the principal branches of mechanical practice, which have either been compiled anew, or drawn from various sources. There are, in addition, about 500 formulas and rules, with data of general utility, classed for ready reference. For the fifth edition, the section dealing with electrical engineering has been largely rewritten, with additions, so as to adapt it to recent developments. In other sections, also, new matter has been added as required, thus bringing the work up to date. There is an index of eighteen pages.

**THE PRACTICAL TESTING OF DYNAMOS AND MOTORS.**

By Charles F. Smith, Assoc. M. Inst. C. E., A. M. I. E. E. Cloth, 9 x 6 ins., 8 + 231 + 3 pp., illus. Manchester, The Scientific Publishing Company. 5 shillings, net.

This little book is intended to serve as an elementary introduction to the study of continuous-current dynamo machinery. The author has endeavored to make use of as little mathematics as possible, results and inferences being discussed in connection with curves obtained in the experiments. The object throughout has been to encourage the student to carry out actual measurements on machines rather than to trust to calculations or formulas. The descriptions of experiments are intended for the use of students who are beginning the study of electrical machinery and for engineers who are only slightly acquainted with electrical work. The chapter headings are: General Purpose of Tests; Measurement of Armature and Field Resistances; Production of Electromotive Force in a Dynamo; The Magnetic Circuit; Armature Reaction; Shunt-Wound Dynamo; The Series Dynamo; The Compound Dynamo; Effect of Current in the Motor Armature; Efficiency Tests of a Motor; Efficiency Tests of a Dynamo; Miscellaneous Tests; Motor Generators and Boosters. There is an index of three pages.

**FIELD AND OFFICE TABLES SPECIALLY APPLICABLE TO RAILROADS.**

By C. Frank Allen, M. Am. Soc. C. E. Leather, 7 x 4 ins., 5 + 293 pp. New York, Spon & Chamberlain, 1903. \$2.00. (Donated by the Author.)

Among the tables in this book are those for easement curves and for earthwork computation, several of which, the author believes, are new. These include the "Cubic Spiral" easement curve, which is arranged for a uniform chord length of 30 feet, and which gives all deflection angles for a large variety of spirals; also the "Offsets from Tangent for a 10° Curve" and "Angles Proportionate to Squares of Distances" are applicable to easement curves, but should be found useful for other purposes. There are also tables for Earthwork Computation. Those for regular three-level sections and for prismoidal correction are based upon tables used for computing the earthwork on many hundred miles on a prominent western railroad, and that for triangular prisms is similar in principle to that for prismoidal correction. Other tables for field use are: "Acres for Strip 100 Feet Wide," "Metric Curves," "Velocity Heights," "Mean Refractions in Declination" and "Stadia Reduction Tables." The table for "Tangent Distances for a 1° Curve" gives values for every minute up to 96°. Fourteen pages are devoted to the explanation of the tables.

**RAILROAD CURVES AND EARTHWORK.**

By C. Frank Allen, M. Am. Soc. C. E. Third Edition. Leather, 7 x 4 ins., 13 + 198 pp. New York, Spon & Chamberlain, 1903. \$2.00. (Donated by the Author.)

The preface states that this book was written especially to meet the needs of students in engineering colleges, but it is hoped that it will be found useful by many engineers in actual practice. In the present edition the chapter on the Spiral Easement Curve has been entirely rewritten and enlarged. Two pages have been added to the chapter on Special Problems on Earthwork. The references to tables have been changed so as to apply to the newly published Tables. The chapter headings are: Reconnaissance; Preliminary Survey; Location Survey; Simple Curves; Compound Curves; Reversed Curves; Parabolic Curves; Turnouts; "Y" Tracks and Crossings; Cubic Spiral Easement Curve; Setting Stakes for Earthworks; Methods of Computing Earthwork; Special Problems in Earthwork; Earthwork Tables; Earthwork Diagrams; Haul; Mass Diagram; Tables and Diagrams.

**COMPRESSED AIR.**

A Treatise on the Theory and Practice of Pneumatic Power Transmission. By William Charles Popplewell, Assoc. M. Inst. C. E. Cloth, 9 x 6 ins., 8 + 284 + 3 pp., illus. Manchester, The Scientific Publishing Company. 7 shillings 6 pence, net.

The author does not claim that his work is exhaustive, but he has made an endeavor to discuss some of the chief points in the problems connected with the compression and transmission of air, and trusts that his notes on the principal features in current practice will prove of service to students as well as to practical engineers responsible for the maintenance and equipment of compressed-air installations. The Contents are: Introductory; General Principles of Pneumatic Transmission of Power; Air

Compressors; Ingersoll-Sargent Air Compressors; West & Jenkin's Air Compressors; Air Controlled Rotary Valves; Air Motors; Appliances and Tools Worked by Compressed Air; Reciprocating Tools; Pneumatic Pumping Appliances; Pipes and Accessories Used in the Transmission of Power by Compressed Air; Compressed Air Calculations; Efficiency Tests of Compressed Air Machinery; Diagrams from a Single-Acting Two-Stage Compressor; Power Transmission. There is an index of three pages.

#### GEWÖLBESCHMUCK IM RÖMISCHEN ALTERTUM.

Studien und Aufnahmen. Von Konstantin Ronczewski. Herausgegeben vom Verfasser. Paper, 13 x 9 ins., 46 pp., illus. Georg Reimer, Berlin, 1903. 12 marks.

In this work the author has attempted to give a description of the most important antique vault decorations, with special attention to the various styles of ornamentation. The illustrations accompanying the volume are largely reproductions of works in Rome and Pompeii and are intended to supplement the short descriptions. The Contents are: Allgemeines; Kassetierte Gewölbe; Stuckdekorationen an Tonnen- und Kreuzgewölben; Plastische Dekorationen sphärischer Gewölbehäfen; Gemalte Dekorationen cylindrischer Gewölbe; Dekoration sphärischer Gewölbe mit Malerei und Mosaik; Schluss.

#### JAHRBUCH FÜR DAS EISENHÜTTENWESEN.

(Ergänzung zu *Stahl und Eisen*.) Ein Bericht über die Fortschritte auf allen Gebieten des Eisenhüttenwesens im Jahre 1901. Im Auftrage des Vereins deutscher Eisenhüttenleute bearbeitet von Otto Vogel. II. Jahrgang. Cloth, 10 x 6 ins., 16 + 464 pp., illus. Düsseldorf, A. Bagel, 1903. 10 marks.

This Yearbook is intended to serve as a supplement to the periodical *Stahl und Eisen*, and to the *technisch-wissenschaftliche Darstellung des Eisenhüttenwesens*, published by the Verein deutscher Eisenhüttenleute. It is a classified, annotated index to both German and foreign periodical literature treating of the metallurgy of iron. The subjects indexed are: Brennstoffe; Feuerungen; Feuerfestes Material; Schlacken; Erze; Werksanlagen; Roheisenerzeugung; Giessereiwesen; Erzeugung des schmiedbaren Eisens; Verarbeitung des schmiedbaren Eisens; Weiterverarbeitung des Eisens; Eigenschaften des Eisens; Legierungen und Verbindungen des Eisens; Materialprüfung.

#### Gifts have also been received from the following:

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| Heyland, Alexander. 2 pam.                                    | Northern Pacific Ry. Co. 2 pam.                         |

Nova Scotia—Dept. of Pub. Works & Mines. 1 pam.	Thacher, Edwin. 1 pam.
Ockerson, J. A. 1 pam.	Toledo, Peoria & Western Ry. Co. 1 pam.
Ohio—State Engr. 1 vol.	U. S. Bureau of Statist'cs. 4 bound vol., 1 vol., 5 pam.
Parsons, Wm. Barclay. 1 vol.	U. S. Geol. Surv. 7 vol., 3 pam.
Queensland—Commr. of Rys. 2 bound vol., 12 vol.	Univ. of Ill. Agri. Exper. Station. 2 pam.
Randolph, Isham. 13 bound vol.	Univ. of Mich. Eng. Soc. 2 vol.
Scranton Engineers' Club. 1 bound vol.	Wakefield, Mass.—Board of Sewer Commrs. 1 vol., 5 pam.
Smith, Jas. Alex. 2 pam.	Western Australia—Commr. of Rys. 7 vol.
South Australia—Rys. Commrs. 2 vol.	Whinery, Samuel. 1 vol.
Tasmania—Gen. Mgr. for Gov. Rys. 15 vol.	

BY PURCHASE.

**Grundriss der Electrotechnik für den praktischen Gebrauch, für Studierende der Electrotechnik und zum Selbststudium.** Von Heinrich Kratzert. 2. Auflage. Vol. 1. Pt. 1. Leipzig und Wien, Frank Deuticke, 1899.

**Gas Engines and Their Troubles.** By E. W. Roberts. With Additional Chapters on Design, Construction, Powering and Propulsion of Launches, by W. F. Durand. New York, Marine Engineering.

**The Design and Equipment of Blast Furnaces.** By John L. Stevenson. Published by the Author, London, 1902.

**Devis et Évaluations.** Par Émile Dardart et Auguste Bonnal. Paris, Vve. Ch. Dunod, 1903.

**Spon's Engineers' Price Book.** A Synopsis of Current Prices and Rates for Engineering Materials and Products. Alphabetically Arranged in Tabular Form, with Lists of Standard Sizes and Extras Chargeable; together with Data Required to be Sent when Ordering, also a Comprehensive and Concise Directory . . . of the Best Makers Arranged in Alphabetical Order. By Thomas G. Marlow. London, E. & F. N. Spon, Ltd.; New York, Spon & Chamberlain, 1903-4.

**Les Pompes.** Par R. Masse. Préface de Haton de la Goupillière. Paris, Vve. Ch. Dunod, 1903.

**The Canal System of England: Its Growth and Present Condition, with Particular Reference to the Cheap Carriage of Goods.** By H. Gordon Thompson. London, T. Fisher Unwin.

SUMMARY OF ACCESSIONS.

September 9th to October 13th, 1903.

Donations (including 26 duplicates) .....	380
By Purchase.....	7
Total.....	387



## MEMBERSHIP.

## ADDITIONS.

MEMBERS.	Date of Membership.
BRECKENRIDGE, WILLIAM LEWIS. Chf. Engr., C., B. & Q. R. R., 209 Adams St., Room 61, Chicago, Ill. ....	Oct. 7, 1903
BURDETT, FREDERICK ANDERSON. Cons. Engr., 3 { Jun. Feb. 2, 1897	
East 33d St., New York City. .... { Assoc. M. June 1, 1898	
..... { M. Oct. 7, 1903	
BUTTS, EDWARD PONTANY. Chf. Engr., Am. Writ- ing Paper Co., Holyoke, Mass. (Res., Spring- field, Mass.) .....	{ Assoc. M. Feb. 2, 1898
..... { M. Oct. 7, 1903	
CARR, ALBERT. Engr., First Div., Rapid Transit Comm., 13 Astor Pl., New York City (Res., 68 Carnegie Ave., East Orange, N. J.) .....	{ Assoc. M. Mar. 2, 1892
..... { M. Oct. 7, 1903	
COLE, WILLIAM WEEDEN. Vice-Pres. and Gen. Mgr., Elmira Water, Light & R. R. Co., Realty Bldg., Elmira, N. Y. .	Oct. 7, 1903
DARLING, FRED STEERE. Div. Engr., C. P. Ry., Montreal, Que., Canada. ....	Oct. 7, 1903
FISHER, SAMUEL BROWNLEE. Chf. Engr., Mo., Kans. & Tex. Ry. Co., 406 Wainwright Bldg., St. Louis, Mo. ....	Oct. 7, 1903
HARDAWAY, BENJAMIN HURT. Gen. Contr., Columbus, Ga. .	Oct. 7, 1903
HORN, FRANK CHURCHILL. Res. Engr., Denver Union Water Co., Cheesman, Colo. ....	Sept. 1, 1903
MARSTON, ANSON. Cons. Engr.; Prof. of Civ. Eng., { Assoc. M. Oct. 4, 1893	
Iowa State Coll., Ames, Iowa ..... { M. Oct. 7, 1903	
POLAND, WILLIAM BARCOCK. Supt., Indiana Div., { Jun. Oct. 31, 1893	
B. & O. S. W. R. R., Cincinnati, Ohio. .... { Assoc. M. May 3, 1899	
..... { M. Sept. 2, 1903	
POST, HENRY WILLIS. Cons. Structural Engr., 281 Fourth Ave. (Res., 507 Maple St., Richmond Hill, Borough of Queens), New York City. ....	Oct. 7, 1903
TAYLOR, SAMUEL ALFRED. 900 Lewis Blk., Pittsburg, Pa. .	Oct. 7, 1903
TAYLOR, SELWYN MELLON. House Bldg., Pittsburg, Pa. .	Oct. 7, 1903
WILCOX, FRANK. Engr. and Director, The T. A. Gillespie Co., 1123 Westinghouse Bldg., Pittsburg, Pa. ....	Oct. 7, 1903

## ASSOCIATE MEMBERS.

BAYLISS, JOHN YANCEY. Asst. Engr., St. L. & San Fran. R. R., Bardstown, Ark. ....	Sept. 2, 1903
BEACH, JAMES GEORGE. Care, Geo. A. Fuller Co., { Jun. Aug. 31, 1897	
North American Bldg., Philadelphia, Pa. . { Assoc. M. Sept. 2, 1903	
FIELD, FREDERICK ELBERT. 1017 Frick Bldg., Pittsburg, Pa. .	Oct. 7, 1903
FRASER, CHARLES EDWARD. 684 St. Nicholas Ave., { Jun. June 4, 1901	
New York City. .... { Assoc. M. Sept. 2, 1903	
FRAZIER, JAMES WELCH. Care, Brown Hoisting Machinery Co., Cleveland, Ohio .....	May 6, 1903



		Date of Membership.
GRANBERY, JULIAN HASTINGS. 561 Walnut St.,	{ Jun.     Sept. 6, 1898 Elizabeth, N. J. . . . . } Assoc. M.     Sept. 2, 1903	
HANKINSON, ALBERT WORTHINGTON. Asst. Engr., Dept. of Finance, 62 West 85th St., New York City. . . . .		Oct. 7, 1903
JOHNSON, ARTHUR NEWHALL. Highway Engr., Maryland Geo- logical Survey, Baltimore, Md. . . . .		Sept. 2, 1903
MACY, ELBERT CLYDE. Asst. Engr., C. G. W. Ry., St. Paul, Minn. . . . .		Sept. 2, 1903
MANAHAN, ELMER GOVE. Asst. Engr., Jersey City Water Supply Co., Oradell, N. J. . . . .		Oct. 7, 1903
PARKER, CHARLES FREDERIC. Supt. of Socavon { Jun.     June 5, 1900 Mines, Cia. Minera de Peñoles, Mapimi, Es- } Assoc. M.     Sept. 2, 1903 tado de Durango, Mexico. . . . .		
PRITCHARD, CLIFFORD MOSES. Asst. Engr., Mo. Val. Bridge & Iron Works, 19th and Cherokee Sts., Leavenworth, Kans. . . . .		April 1, 1903
RAMSEY, GUY ROBERT. Track Engr., Tennessee Coal, Iron & R. R. Co., Box 5, Ensley, Ala. . . . .		Oct. 7, 1903
SENIOR, SAMUEL PALMER. Supt. and Engr., Bridgeport Hydr. Co., 323 Water St., Bridgeport, Conn. . . . .		Oct. 7, 1903
SWIFT, WILLIAM EVERETT. Care, U. S. Geological Survey, Wadsworth, Nev. . . . .		Sept. 2, 1903
THOMPSON, MACKAY JAMES. Mgr., The Imperial Camera & Mfg. Co., La Crosse, Wis. . . . .		Oct. 7, 1903
VAN LOAN, SETH MORTON. 2293 Bridge St., Frank- } Jun.     Dec. 28, 1900 ford, Philadelphia, Pa. . . . . } Assoc. M.     Oct. 7, 1903		
WILTSEE, WILLIAM PHARO. Asst. Engr., Norfolk & West Ry., Kenova, W. Va. . . . .		Oct. 7, 1903

## ASSOCIATES.

SNARE, FREDERICK. Pres., The Snare & Triest Co., 39 Cort- landt St., New York City. . . . .	Oct. 6, 1903
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## JUNIORS.

BURGOYNE, JOHN HENRY, JR. Asst. Engr., M. of W., Buffalo & Susquehanna R. R. Co., Box 331, Galeton, Pa. . . . .	Sept. 1, 1903
DULLER, DAVID MARK. Lake Charles, La. . . . .	Oct. 6, 1903
GAST, E. ALBERT. 524 Considine Ave., Cincinnati, Ohio. . . . .	Oct. 6, 1903
JABELONSKY, CARL HUGO. Care, Cornell Iron Works, 26th St. and 11th Ave., New York City. . . . .	Sept. 1, 1903
JORDAN, WILLIS ROBERT. 13 Kenwood St., Cleveland, Ohio. . . . .	Oct. 6, 1903
MEYERS, CLARENCE WILLIAM. 314 Riverside Drive, New York City. . . . .	Sept. 1, 1903
MURRAY, RAY. 3724 Main St., Wissahickon, Philadelphia, Pa. . . . .	Oct. 6, 1903
OAKLEY, GEORGE ISRAEL. 1913 Amsterdam Ave., New York City. . . . .	Oct. 6, 1903
SHERWOOD, FREDERICK AUGUSTUS. Manheim St., near Wissa- hickon Ave., Germantown, Pa. . . . .	Oct. 6, 1903

# 388 MEMBERSHIP ADDITIONS—CHANGES OF ADDRESS. [Society

	Date of Membership.
SUSSEX, JAMES WELLS. Y. M. C. A. Bldg., Newark, N. J.....	Oct. 6, 1903
SWATTY, DAVID YOUNGS. Asst. Engr., Penn. Lines W. of Pitts., Union Station, Pittsburg, Pa. ....	Oct. 6, 1903
TAYLOR, NORMAN ALFRED. Asst. City Engr., 603 Grand St., Troy, N. Y.....	Oct. 6, 1903

## CHANGES OF ADDRESS.

### MEMBERS.

BAILEY, GEORGE IRVING.....	2023 Boston Rd., New York City.
BALDWIN, HENRY FURLONG.....	Chf. Engr., Chic. & Alton Ry., Grand Central Depot, Chicago, Ill.
BUREANK, GEORGE BARKER.....	White Plains, N. Y.
CHILD, STEPHEN.....	Landscape Archt. and Cons. Engr., 2 A Park St., Boston, Mass.
DARLING, WILLIAM LAFAYETTE.....	Chf. Engr., C., R. I. & P. Ry., Chicago, Ill.
DAVIS, CHANDLER.....	499 Fifth Ave., New York City.
DENNIS, WILLIAM FRANKLIN.....	Monongahela House, Pittsburg, Pa.
DUNN, DANIEL BURKE.....	Div. Engr., Const., Atlanta & Birming- ham Air Line Ry., Austell, Ga.
ELWELL, CHARLES CLEMENT.....	Supt., Air Line, Northampton Div., N. Y., N. H. & H. R. R., New Haven, Conn.
GRIMM, CARL ROBERT.....	1622 Caton Ave., Flatbush, Brooklyn, N. Y.
HARRIS, ELMO GOLIGHTLY.....	Prof. of Civ. Eng., School of Mines and Metallurgy, Univ. of Missouri, Rolla, Mo.
HINCKLEY, HOWARD VERNON.....	Cons. Engr., Sulphur, Ind. T.
HOWARD, JOHN LEWIS.....	Care, Charles River Basin Comm., 367 Boylston St., Boston, Mass.
KENNEDY, JAMES HENRY.....	Chf. Engr., Vancouver, Victoria & East. Ry. & Nav. Co., St. Thomas, Ont., Canada.
KNAP, JOSEPH MOSS.....	220 West 57th St., New York City.
LEWIS, EVERETT WILSON.....	Asst. Engr., N. P. Ry., McKenzie, N. Dak.
LINVILLE, JACOB HAYS.....	117 South 38th St., Philadelphia, Pa.
MACDONALD CHARLES.....	2 Wall St., New York City.
McVEAN, JOHN JAY.....	16 State St., Grand Rapids, Mich.
MILLER, HIRAM ALLEN.....	Chf. Engr., Charles River Basin Comm., 367 Boylston St., Boston (Res., 15 Duncklee St., Newton Highlands), Mass.
MORSE, CHARLES JAMES.....	Care, Orient Coal & Coke Co., Union- town, Pa.

MOSSCROFT, ALFRED MILTON .....	Mgr., Constr. Dept., Dominion Long & Co., Ltd., Middlesbrough, England.
NICHOLS, EDWIN JAY .....	Res. Engr., S. P. Ry. Co., Houston, Tex.
POTTER, CHARLES LEWIS .....	Capt., Corps of Engrs., U. S. A., 549 Providence Bldg., Duluth, Minn.
PRINCE, GEORGE THOMAS .....	Care, Denver Union Water Co., Denver, Colo.
REED, MELVILLE EMERSON .....	Asst. Engr., G. N. Ry., Hoquiam, Wash.
ROHWER, HENRY .....	Chf. Engr., Mo. Pac. Ry. Co., Room 502, Mo. Pac. Bldg. (Res., 5182 Raymond Ave.), St. Louis, Mo.
RUNDLETT, LEONARD W. ....	73 City Court House, St. Paul, Minn.
SMITH, HENRY CLEMENT .....	Div. Engr., Phila. Div., P. & R. Ry., Reading Terminal, Philadelphia, Pa.
SORZANO, JULIO FEDERICO .....	Cons. Engr., 228 Garfield Pl., Brooklyn, N. Y.
STANTON, ROBERT BREWSTER .....	66 Broadway, Room 1504, New York City.
STOREY, WILLIAM BENSON, JR. ....	528 Crossley Bldg., San Francisco, Cal.
TOMLINSON, ALFRED THOMAS .....	404 Glass Blk., Marion, Ind.
TOWL, FORREST MILTON .....	Gen. Supt., National Transit Co., 26 Broadway, New York City (Res., 794 Carroll St., Brooklyn, N. Y.).
TWYMAN, AARON .....	Engr., Constr. Dept., The Pullman Co., 5 Florence Boulevard, Pullman, Ill.
WATSON, WILLIAM PARSONS .....	Columbia, Maury Co., Tenn.
WHITMER, DAVID HEIKES .....	Prin. Asst. Engr., Am. Pipe Mfg. Co., 112 North Broad St., Philadelphia, Pa.

## ASSOCIATE MEMBERS.

BALCH, WILLIAM HOYT .....	Care, Aberthaw Constr. Co., 8 Beacon St., Boston, Mass.
BARR, JOSEPH CARROLL .....	Economy, Pa.
BURCHARD, ANSON WOOD .....	21 Front St., Schenectady, N. Y.
CONNOR, WILLIAM DURWARD .....	1st Lieut., Corps of Engrs., U. S. A., Instr. in Civ. and Military Eng., U. S. Military Academy, West Point, N. Y.
CUNNINGHAM, JOSEPH HOOKER ...	Prin. Asst. Engr., Puget Sound Power Co., Tacoma, Wash.
DOERFLING, RICHARD GEORGE ...	212 Seventh St., Portland, Ore.
EDWARDS, FREDERICK .....	813 Union St., Schenectady, N. Y.
EDWARDS, WARRICK RIGELEY .....	Asst. to Engr. of Bridges and Bldgs., B. & O. R. R. Co., 1039 Calvert Bldg., Baltimore, Md.
EVANS, JOHN MAURICE .....	Insp. of Erection, New East River Bridge, 162 Wilson St., Brooklyn, N. Y.
GUERINGER, LOUIS AMEDEE .....	Div. Engr., Trinity & Brazos Val. Ry. Co., Hillsboro, Tex.

JENCKES, LAWRENCE BATES.....	Stamford, Conn.
LAIS, FRED.....	Care, Westinghouse, Church, Kerr & Co., 10 Bridge St., New York City.
McGEE, VAN NORMAN.....	405 Opera House Bld., Denver, Colo.
MALUKOFF, ALEXIS JOSEPH.....	213 West 136th St., New York City.
MATTHES, GERARD HENDRIK.....	Care, U. S. Geological Survey, Lawton, Okla.
PAINE, HUBBARD ATWELL.....	Res. Engr., Cherokee Constr. Co., Panama (Choctaw Nation), Ind. T.
PFEIFER, HERMAN JULIUS.....	118 Laeclde Bldg., St. Louis, Mo.
SARGENT, JOSEPH ANDREWS.....	Care, U. S. Geological Survey, Montrose, Colo.
SCHENK, CARL LOUIS EDUARD.....	Contr. Engr., Steam Engines and Mine Equipments, 308 House Bldg., Pitts- burg, Pa.
SCHNEIDER, HERMAN.....	Univ. of Cincinnati, Cincinnati, Ohio.
SHELLENBERGER, LEIDY RUDY.....	Care, Supt. U. S. Depot Co., Cincinnati, Ohio.
SMITH, CHARLES WILLIAM.....	Care, O'Rourke Eng. Constr. Co., 26 Nassau St., New York City.
STICKNEY, GEORGE FETTER.....	715 Riverside Ave., Evansville, Ind.
TAIT, JOHN GEORGE.....	849 Burlington Ave., Los Angeles, Cal.
THOMES, EDWIN HOWARD.....	150 Willett St., Jamaica, N. Y.
TILDEN, CHARLES JOSEPH.....	115 Cascadilla Pl., Ithaca, N. Y.
TURNER, DANIEL LAWRENCE.....	220 West 107th St., New York City.
TURNER, GEORGE DALLAS BAIRD....	Vice-Pres. and Gen. Mgr., J. I. C. Min. & Milling Co., 475 Third St., Salt Lake City, Utah.
WATSON, WALTER.....	Johnson Bldg., Ironton, Ohio.
WHITE, LAZARUS.....	Asst. Engr., Rapid Transit R. R. Comm., 4 Court Sq., Brooklyn, N. Y. (Res., 95 West 119th St., New York City).
WRIGHT, JOSEPH BODINE.....	150 West 80th St., New York City.

## JUNIORS.

BELCHER, WALLACE EDWARD.....	Harvard Univ., Cambridge, Mass.
BELZNER, THEODORE.....	Insp., Steel Constr., East Side Viaduct, Sec. 10, Fourth Div., Rapid Transit R. R. Comm., Home St. and Southern Boulevard (Res., 584 Lenox Ave.), New York City.
BOUTON, GEORGE HAROLD.....	89 Danforth Ave., Jersey City, N. J.
COBB, SAMUEL ALLEN.....	City Engr., Muskogee, Ind. T.
CUMMINGS, NOAH.....	213 West 136th St., New York City.
FORBES, HENRY DE BRETTON.....	Engr., H. E. Talbott & Co., Mishawaka, Ind.
GEORGE, HUGH MELVIN.....	195 Eighth St., Troy, N. Y.
HAUSMAN, FREDERICK APPEL.....	514 Union St., Allentown, Pa.

HAYDEN, EDWIN CLAPP . . . . .	16 City Sq., Room 4, Charlestown, Mass.
HULSE, SHIRLEY CLARKE . . . . .	Taughannock Falls, N. Y.
IVES, HOWARD CHAPIN . . . . .	Asst. Prof. of Civ. Eng., Univ. of Pennsylvania, Philadelphia, Pa.
KOLB, HENRY JACOB . . . . .	Terminal Engr.'s Office, N. Y. C. & H. R. R., 110 East 50th St., New York City.
MACHEN, HENRY BENNETT . . . . .	Asst. Engr., Rapid Transit R. R. Commrs. (Res., 315 West 95th St.), New York City.
MOORE EGBERT JESSUP . . . . .	Box 161, Royersford, Pa.
MORE, CHARLES CHURCH . . . . .	Fort Worden, Port Townsend, Wash.
SEABURY, GEORGE TILLEY . . . . .	Care, The O'Rourke Eng. Constr. Co., 26 Nassau St., New York City.
SNYDER, CHARLES HERMAN . . . . .	Structural Draftsman, Solvay Process Co., 705 Willis Ave., Syracuse, N. Y.
VAN PELT, SUTTON . . . . .	Care, U. S. Engr. Office, Tidewater, Ala.
WILSON, WILLIAM EDWARD . . . . .	Asst. Prof. of Civ. Eng., Univ. of Utah, 326 C St., Salt Lake City, Utah.

#### DEATHS.

CUSEING, ROBERT DELANO . . . . .	Elected Associate Member, September 6th, 1899; died August 23d, 1903.
PATTERSON, JOHN AUSTIN . . . . .	Elected Member, May 2d, 1900; died May 3d, 1903.



## MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(September 9th to October 13th, 1903.)

NOTE.—*This list is published for the purpose of placing before the members of the Society the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

### LIST OF PUBLICATIONS.

*In the subjoined list of articles references are given by the number prefixed to each journal in this list.*

- (1) *Journal, Assoc. Eng. Soc.*, 257 South Fourth St., Philadelphia, Pa., 30c.
- (2) *Proceedings, Engrs. Club of Phila.*, 1122 Girard St., Philadelphia, Pa.
- (3) *Journal, Franklin Inst.*, Philadelphia, Pa., 50c.
- (4) *Journal, Western Soc. of Engrs.*, Monadnock Block, Chicago, Ill.
- (5) *Transactions, Can. Soc. C. E.*, Montreal, Que., Canada.
- (6) *School of Mines Quarterly*, Columbia Univ., New York City, 50c.
- (7) *Engineering Quarterly*, Mass. Inst. Tech., Boston, Mass., 75c.
- (8) *Stevens Institute Indicator*, Stevens Inst., Hoboken, N. J., 50c.
- (9) *Engineering Magazine*, New York City, 25c.
- (10) *Cassier's Magazine*, New York City, 25c.
- (11) *Engineering*, London, W. H. Wiley, New York City, 25c.
- (12) *The Engineer*, London, International News Co., New York City, 35c.
- (13) *Engineering News*, New York City, 15c.
- (14) *The Engineering Record*, New York City, 12c.
- (15) *Railroad Gazette*, New York City, 10c.
- (16) *Engineering and Mining Journal*, New York City, 15c.
- (17) *Street Railway Journal*, New York City, 35c.
- (18) *Railway and Engineering Review*, Chicago, Ill., 10c.
- (19) *Scientific American Supplement*, New York City, 10c.
- (20) *Iron Age*, New York City, 10c.
- (21) *Railway Engineer*, London, England, 25c.
- (22) *Iron and Coal Trades Review*, London, England, 25c.
- (23) *Railroads, American Iron and Steel Assoc.*, Philadelphia, Pa.
- (24) *American Gas Light Journal*, New York City, 10c.
- (25) *Power and Engineer*, New York City, 20c.
- (26) *Practical Engineer*, London, England.
- (27) *Practical World and Engineer*, New York City, 10c.
- (28) *Journal, New England Water Works Assoc.*, Boston, \$1.
- (29) *Journal, Society of Arts*, London, England, 15c.
- (30) *Revue des Travaux Publics de Belgique*, Brussels, Belgium.
- (31) *Annuaire des Travaux de la Société des Travaux Publics de Grand*, Brussels, Belgium.
- (32) *Mémoires et Compte Rendu des Travaux*, Soc. Ing. Civ. de France, Paris, France.
- (33) *Le Génie Civil*, Paris, France.
- (34) *Portefeuille Economique des Machines*, Paris, France.
- (35) *Nouvelles Annales de la Construction*, Paris, France.
- (36) *La Revue Technique*, Paris, France.
- (37) *Revue de Mécanique*, Paris, France.
- (38) *Revue Générale des Chemins de Fer et des Tramways*, Paris, France.
- (39) *Railway Master Mechanic*, Chicago, Ill., 10c.
- (40) *Railway Age*, Chicago, Ill., 10c.
- (41) *Modern Machinery*, Chicago, Ill., 10c.
- (42) *Transactions, Am. Inst. Elec. Engrs.*, New York City, 50c.
- (43) *Annales des Ponts et Chaussées*, Paris, France.
- (44) *Journal, Military Service Institution*, Governor's Island, New York Harbor, 50c.
- (45) *Mines and Minerals*, Scranton, Pa., 20c.
- (46) *Scientific American*, New York City, 8c.
- (47) *Mechanical Engineer*, Manchester, England.
- (48) *Transactions, Am. Soc. C. E.*, New York City, \$5.
- (49) *Transactions, Am. Soc. M. E.*, New York City, \$10.
- (50) *Transactions, Am. Inst. Min. Engrs.*, New York City, \$5.
- (51) *Colliery Guardian*, London, England.
- (52) *Proceedings, Eng. Soc. W. Pa.*, 410 Penn Ave., Pittsburg, Pa., 50c.
- (53) *Transactions, Mining Inst. of Scotland*, London and Newcastle-upon-Tyne.
- (54) *Municipal Engineering*, Indianapolis, Ind., 25c.
- (55) *Proceedings, Western Railway Club*, 225 Dearborn St., Chicago, Ill., 25c.
- (56) *American Manufacturer and Iron World*, 59 Ninth St., Pittsburg, Pa.
- (57) *Minutes of Proceedings, Inst. C. E.*, London, England.
- (58) *Power*, New York City, 20c.
- (59) *Official Proceedings*, New York Railroad Club, Brooklyn, N. Y., 15c.
- (60) *Journal of Gas Lighting*, London, England, 15c.
- (61) *Cement and Engineering News*, Chicago, Ill., 25c.
- (62) *Mining Journal*, London, England.
- (63) *Mill Owners*, New York City, 10c.
- (64) *Engineering Review*, New York City, 10c.
- (65) *Journal, Iron and Steel Inst.*, London England.

## LIST OF ARTICLES.

**Bridge.**

- The Mississippi River Bridges: Historical and Descriptive Sketch of the Bridges over the Mississippi River. F. B. Malby. (4) Aug.  
 A Great Ferry Bridge.\* (12) Aug. 28.  
 A Model Bridge and Construction Shop: Pennsylvania Steel Company's New Plant. (20) Serial beginning Sept. 10; (14) Serial beginning Sept. 26.  
 The Viarv Viaduct on the Railway Line from Carmaux to Rodez, France.\* René Bonnin. (13) Sept. 10.  
 Connel Ferry Railway Bridge.\* (12) Sept. 11.  
 Engineering Aspects of the Kansas Floods.\* Waddell & Hedrick. (14) Sept. 12; (13) Sept. 17; (15) Sept. 18.  
 Erection of the Girna Bridge, India.\* (12) Serial beginning Sept. 25.  
 The Marietta Long-Span Highway Bridge.\* (14) Serial beginning Sept. 26.  
 The Substructure of the Mingo Bridge over the Ohio River.\* (14) Oct. 3.  
 The Method of Manufacturing the Large Eye-Bars for the Thebes Bridge. P. S. Hildreth. (13) Oct. 8.  
 The Pennsylvania Railroad Bridge over the Raritan River, at New Brunswick, N. J.\* (14) Oct. 10.  
 The Ashland Avenue Bascule Bridge, Chicago.\* (14) Oct. 10.  
 Note sur les Pièces Chargées de Bout Présentant Plus de Deux Points Fixés. F. Koethoff. (31) Pt. 2, 1903.  
 Pont en Béton, sur le Neckar, près de Neckarhausen (Hohenzollern).\* (35) Sept.  
 Passerelle en Béton Armé sur le Canal du Midi à Toulouse.\* G. Espitalier. (33) Sept. 5.  
 Le Déplacement de la Passerelle de l'assy sur la Seine, à Paris.\* J. Feugères. (33) Sept. 19.

**Electrical.**

- A High-Voltage Power Transmission.\* M. H. Gerry, Jr., Assoc. M. Am. Soc. C. E. (54) Vol. 50.  
 The Calculator Board and Graphic Methods (electrical localization of faults in submarine cables). (26) Aug. 28.  
 An Oil Engine Central Station.\* Howard S. Knowlton. (26) Aug. 28.  
 Design for 1 H.-P. Self-Starting Single-Phase Induction Motor.\* (Reprinted from the *American Electrician*.) (47) Aug. 29.  
 The Induction Motor and Its Engineering Capabilities.\* George L. Hoxie. (3) Serial beginning Sept.  
 The Otis Elevator Company's Electric Elevator for Private Residences.\* (Report of the Committee on Science and the Arts of the Franklin Inst.) (3) Sept.  
 Electric Lighting and Traction at Southend-on-Sea.\* (26) Sept. 4.  
 On a New Method of Tuning Wireless Telegraph Stations by Means of the "Multiplier."\* Count Arco. (26) Serial beginning Sept. 4.  
 The West Penn Railways and Lighting System.\* (17) Sept. 5.  
 Central Avenue Power Station, Kansas City, Kan.\* H. S. Badger and G. E. Schreiber. (27) Sept. 5.  
 Electrical Transmission from Boston. (27) Sept. 5.  
 Rise of Efficiency in Electric Stations. Allen D. Adams. (27) Sept. 5.  
 Isolated Plant vs. Central Stations Supply of Electricity: A Suggestion for Obtaining Estimates of Costs on a Competitive Basis. R. S. Hale. (27) Sept. 5.  
 An Object Lesson in Telephone Receivers.\* Arthur V. Abbott. (27) Serial beginning Sept. 5.  
 Overhead Traction for Road Vehicles: The Stoll System.\* (26) Sept. 11.  
 Power Plant of the Cambridge Electric Light Company, Cambridge, Mass.\* (27) Sept. 12.  
 Tests of the Edison Storage Battery.\* (27) Sept. 12.  
 Arrangement and Control of Long-Distance Transmission Lines. E. W. Cowan and L. Andrews. (Paper read before the Inst. of Elec. Engrs.) (47) Serial beginning Sept. 12.  
 Breakdowns of Electrical Machinery. Michael Longridge, M. Inst. C. E. (47) Sept. 12.  
 Portable Electric Light Plants.\* Frank C. Perkins. (24) Sept. 14.  
 The Use of Aluminum as an Electrical Conductor. John B. C. Kershaw. (Paper read before the British Assoc. for the Advancement of Science.) (26) Sept. 18; (47) Oct. 3.  
 The New Electricity Works of the Manchester Corporation (Additional Notes).\* (26) Sept. 18.  
 Evershed Testing Set.\* (27) Sept. 19.  
 York Haven, Pa., Transmission Plant.\* (27) Sept. 19.  
 The Electric Drive as Applied to Machine Tools, with Special Reference to Railroad Shops. C. H. Hines. (27) Sept. 19.  
 Fessenden's Work in Wireless Telegraphy.\* A. Frederick Collins. (27) Sept. 19.  
 Electric Plant Failures: Their Origin and Prevention. A. C. Cormack. (From Paper read before the Inst. of Min. Engrs.) (24) Serial beginning Sept. 21.  
 On Three Phase Switch Gear.\* A. C. Eborall. (11) Serial beginning Sept. 25.  
 The N. S. Secondary Cell.\* (26) Sept. 25.  
 On Single-Phase Repulsion Motors.\* William Cramp, A. M. I. E. E. (Paper read before the British Assoc. for the Advancement of Science.) (26) Serial beginning Sept. 25.



**Electrical—(Continued).**

- Motor Generators and Rotary Converters.\* H. M. Hobart. (26) Serial beginning Sept. 25.
- A Notable Example of Central Station Supply of Electric Power and Light.\* (14) Sept. 26.
- Alternating Current Switchboards.\* Stephen Q. Hayes. (27) Serial beginning Sept. 26.
- Overhead Pole Line Construction and Operation for Central Stations. A. H. Manwaring and J. T. Hutchings. (Paper read before the Assoc. of Edison Illuminating Companies.) (27) Sept. 26.
- Electric Trolley Vehicles without Rails.\* Emil Guarini. (9) Oct.
- Motor Driven Machine Tools; Recent Practice in the Application of Electric Driving to Drilling Machinery.\* (25) Oct.
- Westinghouse Variable Speed Induction Motor.\* (64) Oct.
- The Parallel Working of Alternators. B. Hopkinson. (Paper read before the British Assoc. for the Advancement of Science.) (11) Oct. 2.
- Protective Devices for High Tension Electrical Systems.\* W. B. Woodhouse, A. M. I. Mech. E. (Paper read before the British Assoc. for the Advancement of Science.) (26) Oct. 2.
- Armature Testing with a Milli-Voltmeter.\* Cale Gough. (17) Oct. 3.
- Electrical Supply in Fitchburg.\* (27) Oct. 3.
- A Proof of the Law for Grouping Cells to Obtain Maximum Current. E. Dana Pierce. (27) Oct. 3.
- A Possible Source for Securing Wide Speed Range in Direct-Current Motors. Albert F. Hemingway. (27) Oct. 3.
- Tests of Oerlikon Motor-Generator Sets for the Stockholm Central Station.\* (27) Oct. 3.
- On an Attempt to Construct an Electrostatic Transformer.\* James Edmund Ives. (27) Oct. 10.
- Three-Phase Power Measurements.\* F. Hardie Jeannin. (27) Oct. 10.
- Réaction d'Induit des Alternateurs. C. F. Guilbert. (36) Serial beginning Sept. 25.

**Marine.**

- The New Graving Dock of the Kawasaki Dock Yard Co. at Kobe, Japan.\* Genjiro Yamasaki. (13) Sept. 29.
- Electrically Operated Floating Dry Dock.\* Tom T. Donnelly. (27) Oct. 3.

**Mechanical.**

- The Steel-Plant at Monterrey, Mexico.\* William White, Jr. (56) Vol. 32.
- Experiments and Observations in Soaring Flight.\* Wilbur Wright. (4) Aug.
- Centrifugal Fans. J. H. Kinealy. (70) Serial beginning Aug.
- Entropy, or Thermodynamics from an Engineer's Standpoint. J. Swinburne. (11) Serial beginning Aug. 28.
- Four-Cylinder Gas Engine.\* (12) Aug. 28.
- The Brotherhood Engine Works.\* (26) Aug. 28.
- An Oil Engine Central Station.\* Howard S. Knowlton. (26) Aug. 28.
- A Plea for Better Boiler Water. John H. Wynne. (39) Serial beginning Sept.
- Modern High Speed Tool Steels.\* H. M. Lane. (69) Sept.
- A New System of Motor Traction.\* A. W. Brightmore, M. Inst. C. E. (Paper read before the Liverpool Eng. Soc.) (47) Sept. 5.
- Petroleum in California. Edmond O'Neill. (24) Sept. 7.
- A Model Bridge and Construction Shop: Pennsylvania Steel Company's New Plant.\* (20) Serial beginning Sept. 10; (14) Serial beginning Sept. 26.
- Emery Wheel Practice in Foundries. Charles G. Smith. (Paper read before the Pittsburgh Foundrymen's Assoc.) (20) Sept. 10.
- The Darlington Works of Robert Stephenson and Company.\* (12) Serial beginning Sept. 11.
- Paper Manufacture. Julius Hübner. (29) Serial beginning Sept. 11.
- Tests of the Efficiency of Hoisting Tackle. S. L. Wonson. (14) Sept. 12.
- The Mechanical Conveying of Coal and Coke.\* Emile Guarini. (19) Serial beginning Sept. 12.
- The Flying Machine and Its Slow Development. (From the *Public Ledger*.) (19) Sept. 12.
- Recent Steam Turbine Developments. W. L. R. Emmet. (Paper read before the Amer. St. Ry. Assoc.) (27) Sept. 12; (17) Sept. 12; (26) Serial beginning Sept. 25.
- The Mechanical Drying of Minerals. C. O. Bartlett. (Abstract of Paper read at Amer. Min. Cong.) (13) Sept. 17.
- Gas Engine Principles and Management.\* E. W. Roberts. (13) Sept. 17.
- The Manufacture of Ethyl Alcohol from Wood.\* (20) Sept. 17.
- The Lefevre Four-Cylinder High Speed Engine.\* (62) Sept. 17.
- A Further Note on Gas-Engine Explosions. H. E. Wimperis, Assoc. M. Inst. C. E. (Paper read before the British Assoc.) (11) Sept. 18.
- Cast Iron for Piston Rings. C. H. Wingfield. (Paper read before the British Assoc.) (11) Sept. 18.
- Power Plant of the Rock Island—Lake Shore Terminal Station, Chicago.\* (14) Sept. 19.
- Hot-Water Heating in a Coal Country. Alton D. Adams. (14) Sept. 19.





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- The Electric Drive as Applied to Machine Tools, with Special Reference to Railroad Shops. C. H. Hines. (27) Sept. 19.
- Oil and Tar Burning on the Pacific Coast.\* (24) Sept. 21.
- Steel Building Construction in Gas Works.\* Saml. Cutler, Jr. (Paper read before the Eastern Counties Gas Mfgs. Assoc.) (66) Sept. 22.
- The Resistance of Road Vehicles to Traction.\* (Report of Committee of the British Assoc. for the Advancement of Science.) (11) Sept. 25.
- Developments in Automobile Construction. T. Clarkson. (Paper read before the British Assoc. for the Advancement of Science.) (12) Serial beginning Sept. 25.
- Emergency Fuels. (22) Sept. 25.
- Engine Breakdowns. Michael Longridge. M. Inst. C. E. (47) Sept. 26.
- Gas Engine Explosions. H. E. Wimperis, Assoc. M. Inst. C. E. (Paper read before the British Assoc. for the Advancement of Science.) (47) Sept. 26.
- The House of the Inclined Retort in England.\* (66) Sept. 26.
- The Bellows Water-Gas Process. (66) Sept. 29; (24) Oct. 12.
- Recent Developments of the Steam Turbine.\* A. Rateau. (9) Oct.
- The Equipment of the Foundry.\* Joseph Horner. (10) Oct.
- Steam Waggon for Commercial Use.\* R. G. L. Markham, M. Inst. M. E. (10) Oct.
- Increasing the Coke Yield from Bee-Hive Ovens: Wastes in American Practice.\* Charles Catlett. (10) Oct.
- Motor-Driven Machine Tools; Recent Practice in the Application of Electric Driving to Drilling Machinery.\* (25) Oct.
- Portland Cement Manufacture: Preparation of Slag-Limestone Mixtures. Edwin C. Eckel. (60) Oct.
- The Manufacture and Strength of Sand Brick. S. V. Peppel. (Abstract of article in *Technic*, Amer. Ceramic Soc.) (60) Oct.
- Difficulties in Making Clear Ice. William Kavanagh. (64) Oct.
- Commercial Wrought Iron and Steel Pipe. Franklin Riddle, M. Am. Soc. C. E. (Paper read before the Pacific Coast Gas Assoc.) (13) Oct. 1; Abstract (20) Sept. 10.
- Kilroy's Stoking-Indicators.\* (11) Oct. 2.
- 20-Ton Steam Jib Crane.\* (12) Oct. 2.
- The California Asphaltum Industry.\* F. H. Minard. (16) Oct. 3.
- European Floating and Dock Cranes.\* Frank C. Perkins. (46) Oct. 3.
- Horizontal Boring Machines.\* Thomas R. Shaw. (47) Serial beginning Oct. 3.
- The La Belle Iron Works.\* (20) Oct. 8.
- A Ten-Thousand-Horse-Power Chimney.\* (14) Oct. 10.
- The Flight of Birds Mechanically Studied.\* Emile Guarini. (46) Oct. 10.
- Curtis Steam Turbine.\* Austin R. Dolge. (Abstract of Paper read before the New England Cotton Mfrs'. Assoc.) (17) Oct. 10; (27) Oct. 10.
- Sur le Choix de l'Obliquité de la Ligne d'Engrènement pour les Engrenages à Développement: Considerations Theoriques et Pratiques.\* Edmond Dubosc. (37) Aug.
- Essais de Machines à Vapeur avec et sans Surchauffe. L. Pierre-Guédon. (34) Sept.
- Appareils à Alcool: Lampe Intensive à Alcool Dénaturé.\* Edmond Brunet. (36) Sept. 10.

**Metallurgical.**

- The Pachuca Stamp-Battery and Its Predecessors. M. P. Boss. (56) Vol. 32.
- The Iron Mountain, and the Plant of the Mexican National Iron and Steel Company, Durango, Mexico.\* T. F. Witherbee. (56) Vol. 32.
- The Treatment of Clay-Slimes by the Cyanide Process and Agitation.\* E. A. H. Tays and F. A. Schiertz. (56) Vol. 32.
- An Adobe Reverberatory Furnace.\* John Gross. (56) Vol. 32.
- The Patio Process for Amalgamation of Silver-Ores. Manuel Valerio Ortega. (56) Vol. 32.
- The Steel Plant at Monterrey, Mexico.\* William White, Jr. (56) Vol. 32.
- The Mechanical Feeding of Silver-Lead Blast-Furnaces.\* Arthur S. Dwight. (56) Vol. 32.
- A Study of Amalgamation Methods, Especially the Patio Process, with the Object of Avoiding the Loss of Mercury. Miguel Bustamante, Jr. (56) Vol. 32.
- Goldschmidt Method of Metallurgy and High Temperature Production by Means of Thermite. B. Palmer Caldwell. (1) Aug.
- Electrically Operated Machinery at Rolling Mills and Blast Furnaces.\* (41) Sept.
- The Small Converter Process for the Manufacture of Steel Castings. Arthur Simonson. (Paper read before the Phila. Foundrymen's Assoc.) (20) Sept. 10.
- Manufacture of S-and Castings by Means of Thermit. J. B. Nau. (20) Sept. 10.
- Method of Concentrating at Anaconda.\* M. Schwern. (16) Sept. 12.
- Two Notable Concentrating Plants.\* G. A. Burr. (16) Sept. 12.
- Blast Furnace Conditions and Foundry Iron. W. Walley Davis. (Abstract of paper read before the Amer. Foundrymen's Assoc.) (47) Sept. 12.
- Crystallization of Iron and Steel. (62) Serial beginning Sept. 17.
- Method of concentrating at La Comana.\* Martin Schwern. (16) Sept. 26.
- Treatment of Concentrates in the Rand.\* H. S. Denny. (16) Sept. 26.
- Treatment of Pyrites Containing Combined Gold. (16) Sept. 26.
- Alloys Used for Steel Making. J. Ohly. (45) Serial beginning Oct.
- The Refining of Lead Bullion. F. L. Piddington. (Abstract from the *Journal of the Chemical, Metal, and Min. Soc. of South Africa*.) (16) Oct. 3.



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- An Improved Method of Crushing for Gold Milling. Edward D. Chester. (Abstract from the *Journal of the Chemical, Metal, and Min. Soc. of South Africa.*) (16) Oct. 3.
- The Making of 18-Inch Steel Eye-Bars. Wm. R. Webster. *M. Am. Soc. M. E.* (13) Oct. 8.
- The Method of Manufacturing the Large Eye-Bars for the Thebes Bridge. P. S. Hildreth. (13) Oct. 8.
- The La Belle Iron Works.\* (20) Oct. 8.
- Milling at the Alaska Treadwell. Robt. A. Kinzie. (16) Oct. 10.
- Considérations Générales sur la Préparation Mécanique des Minerais. Paul Machavaine. (32) Aug.
- Le Vanadium en Métallurgie—Son Action sur le Fer et sur l'Acier. S. Marsollan. (36) Serial beginning Sept. 25.

**Military.**

- Late Developments in Ordnance and Armor.\* John F. Meigs. (10) Oct.

**Mining.**

- The Sierra Mojada, Coahuila, Mexico, and Its Ore-Deposits.\* James W. Malcolmson. (56) Vol. 32.
- The Coal-Fields of Las Esperanzas, Coahuila, Mexico.\* Edwin Ludlow. (56) Vol. 32.
- A New Safety Explosive. Richard T. Dana, Assoc. M. Am. Soc. C. E. (54) Vol. 50.
- The Latest Progress in Shaft Sinking.\* Riemer. (Translated from the Report of the Eighth General German Min. Cong.) (6) Apr.
- Report of the Royal Commission on Coal Supplies (Abstract).\* (57) Serial beginning Aug. 28.
- Systematic Timbering: Report of the Prussian Commission on Falls of Roof and Coal.\* (57) Aug. 28.
- Coal-Cutting Machines with Three-Phase Motors.\* (26) Sept. 11.
- The Use of Stanley Coal-Heading Machines in the Rapid Development and Working of the Nuneaton Colliery, Warwickshire. F. C. Swallow. (Abstract of Paper read before the Inst. of Min. Engrs.) (57) Sept. 11.
- Electric Coal-Cutting. W. Walker. (Abstract of paper read before the Inst. of Min. Engrs.) (57) Serial beginning Sept. 18.
- Ore-Breaking and Sorting on the Rand. H. S. Denny. (16) Sept. 19.
- Aerial Tramways. Stephen De Zomboria. (Address before the Amer. Min. Cong.) (20) Sept. 24; Abstract (16) Oct. 3; (14) Oct. 10.
- Polyphase Electric Plant at the Staveley Coal and Iron Company's Collieries.\* (22) Sept. 25.
- Gob-Fires, their Theory and Practice. George Farmer. (Paper read before the Yorkshire Branch of the National Assoc. of Colliery Mgrs.) (22) Sept. 25.
- Progress at the Dover Colliery: Shaft-Sinking by the Kind-Chaudron System.\* (57) Sept. 25.
- Relative Advantage of 2300-Volt Alternating Current Versus 550-Volt Direct Current, for Mine and Smelter Work. Hugh A. Brown. (16) Sept. 26.
- The Coal Mining Industry of the United Kingdom.\* R. A. S. Redmayne. (9) Serial beginning Oct.
- Diamond Mining in the Kimberley Field.\* Chas. V. Allen. (9) Oct.
- The Spraying or Watering Problems of Dusty Mines.\* James Ashworth. (45) Oct.
- Sinking and Equipping No. 9 Shaft, at Ashland Mine, of the Cleveland-Cliffs Iron Company, at Ironwood, Michigan.\* H. F. Ellard. (Paper read before the Lake Superior Min. Inst.) (45) Oct.; (13) Oct. 8.
- Car for Handling Rock at Mines.\* L. L. Logan. (45) Oct.
- High Explosives.\* J. H. Karkeet. (Paper read before the Lake Superior Min. Inst.) (45) Oct.; Abstract (16) Sept. 19.
- Sherwood Colliery Sinking. (Abstract of paper read before the Inst. of Min. Engrs.) (57) Oct. 2.
- A Portable Tank for Watering Roadways in Mines.\* W. Galloway. (Paper read before the South Wales Inst. of Engrs.) (22) Oct. 2.
- New Rock-Handling Machinery.\* Alexander Forsyth. (16) Oct. 3.

**Miscellaneous.**

- Some of the Engineering Features of the Louisiana Purchase Exposition, St. Louis, 1904. (14) Serial beginning Oct. 3.
- Mining and Manufacture of Rock Salt.\* F. E. Englehardt. (19) Oct. 3.
- Le Reboisement des Montagnes.\* (33) Sept. 26.

**Municipal.**

- The Siemens and Halske Fire Alarms.\* (19) Sept. 19.
- Costs and Prices of Gas and Electric Lighting by Municipal Plants. Alton D. Adams. (60) Oct.
- The Six-Inch Macadam Streets of Hudson, N. Y.\* H. K. Bishop. (13) Oct. 8.

**Railroad.**

- The Mexican Railroad-System. Victor M. Braschi and Ezequiel Ordoñez. (56) Vol. 32.
- Mexican Railroads and the Mining Industry.\* Luis Salazar. (56) Vol. 32.



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- Virtual Grades for Freight Trains.\* A. C. Dennis, M. Am. Soc. C. E. (54) Vol. 50.  
 Switching Locomotive, Chicago, Milwaukee & St. Paul Railway.\* (39) Aug.  
 New Round House of the Rio Grande & Eagle Pass Railway.\* (39) Aug.  
 Private Owners' Wagon Specifications and Drawings Issued by the Railway Clearing  
 House Committee.\* (57) Serial beginning Aug. 28; (21) Oct.  
 Ballast for Railways. (12) Aug. 28.  
 A New Tunnel at Genoa.\* (12) Aug. 28.  
 Handholds on Locomotives.\* (61) Sept.  
 Water Treatment in Railroad Operation. G. R. Henderson. (61) Sept.  
 Automatic Electric Railway Signaling; Its purposes; also Past and Present Installations.  
 C. C. Rosenberg and H. S. Balliet. (3) Sept.  
 Points and Crossing or Junction Diagram; with Explanatory Notes and Formulae  
 adapted to the British Standard Gauge.\* F. W. Atkinson. (21) Sept.  
 A Plea for Better Boiler Water. John H. Wynne. (39) Serial beginning Sept.  
 Saddle Tank Switching Locomotive, New York Glucose Company.\* (39) Sept.  
 The Operation of the Burlington Tie Treating Plant.\* F. J. Angier. (40) Sept. 4.  
 Steel-Frame Slide-Door Passenger Car, Illinois Central Ry.\* (15) Sept. 5; (40) Sept. 4;  
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 The West Penn Railways and Lighting System.\* (17) Sept. 5.  
 Improvements in Interurban Cars and Motors by the Milwaukee Electric Railway &  
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 Locomotive Proportion by Graphical Methods. F. K. Caswell. (18) Sept. 5.  
 The Toledo Railway & Terminal Company.\* (40) Sept. 11.  
 Wheeling & Lake Erie Compound Consolidation.\* (40) Sept. 11.  
 The Care of Locomotive Boilers. M. E. Wells. (Paper read before the Pacific Coast  
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 The Rock Island Terminal Station, Chicago, Ill.\* (14) Sept. 12.  
 Four-Cylinder Balance Compound Applied to a Ten-Wheeler.\* (18) Sept. 12.  
 The Leamington Cut-Off of the Oregon Short Line R. R. in Western Utah. W. P. Hard-  
 esty. (13) Sept. 17.  
 Care and Handling of the Compound Locomotive. A. L. Beardsley. (Abstract of paper  
 read before the Travelling Engrs. Convention.) (15) Sept. 18.  
 Cutting's Disk Signal.\* (15) Sept. 18.  
 Baltimore & Ohio's Reconstruction.\* (40) Sept. 18.  
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 Construction Work on the Pennsylvania R. R. between Harrisburg and Gallitzin.\*  
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 Ten-Wheel Express Locomotive, Glasgow and South-Western Railway.\* (11) Sept. 25.  
 The Miller Cab Signal on the New York Central. (15) Sept. 25.  
 Norfolk & Western Yard Improvements.\* Geo. L. Fowler. (15) Sept. 25.  
 Heavy Suburban Locomotive for the Philadelphia & Reading.\* (15) Sept. 25; (40)  
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 2-8-0 Freight Locomotive, N. & W. Ry.\* (18) Sept. 26.  
 Special Features in the Design of Locomotive Boilers and Fireboxes.\* Chas. S. Lake.  
 (6) Serial beginning Oct.  
 Lighting Railway Carriages by Incandescent Mantles.\* (21) Oct.  
 New Passenger Locomotives, Pacific or 4-6-2 Type, Chicago, Rock Island and Pacific  
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 Steel Car Development, Pennsylvania Railroad.\* (25) Serial beginning Oct.  
 Two Systems of Using Acetylene Gas for Car Lighting. (13) Oct. 1.  
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 Experiments with a New Type of Compound Locomotive in Italy.\* (12) Serial begin-  
 ning Oct. 2.  
 Some Notes on Train Resistance. C. F. Dendy Marshall. (12) Oct. 2.  
 Norfolk & Western Road Improvements.\* Geo. L. Fowler. (15) Oct. 2.  
 A 100-Ton Wrecking Crane.\* (15) Oct. 2.  
 The Schmidt Superheater for Locomotives.\* (40) Oct. 2.  
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 Auburn & Syracuse Electric Railway.\* (17) Oct. 3.  
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 Notes on the Operating Practice of the Indiana Union Traction Company. (17) Oct. 3.  
 The Ware Pneumatic Rail Unloader.\* (18) Oct. 3; (13) Oct. 8.  
 Painting and Maintaining Steel Cars. (Abstracts of papers by J. D. Wright and W. O.  
 Quest read before the Master Car and Locomotive Painters' Assoc.) (13) Oct. 8.  
 The New York Terminal of the Pennsylvania Railroad.\* (15) Serial beginning Oct. 9.  
 A Rational Method of Design of Locomotive Frames.\* G. S. Edmonds. (Abstract of  
 Paper presented at meeting of the Pacific Coast Railway Club.) (15) Oct. 9.  
 Tandem-Compound Santa Fé Type (2-10-2) Locomotive for the Santa Fé.\* (15) Oct. 9.  
 The Illinois Central Improvements—Signaling.\* (15) Oct. 9.  
 A New Consolidation Locomotive for the Long Island Railroad.\* (40) Oct. 9.





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- A Study of Engine Frames. G. S. Edmonds. (18) Oct. 10.  
 The Improved Harris Track Laying Machine.\* (18) Oct. 10.  
 The Coughlin Swing Rail Frog and Automatic Detector Switch Lock.\* (18) Oct. 10.  
 Tunnels for the New York City Terminus of the Pennsylvania and Long Island Railroads.\* (14) Oct. 10.  
 La Traction Electrique et les Trains à Unités Multiples.\* Jean de Traz. (32) Aug.  
 Simplon et Faucille: Rôle Économique d'une Nouvelle Ligne Internationale.\* Louis Laffitte. (33) Serial beginning Aug. 29.  
 Des Relations d'Enclenchements à Distance entre les Postes ou Cabines par Desengageurs et Safety Locks.\* M. Cuny. (38) Sept.  
 Note sur la Machine Compound à Train Articulé à 4 Cylindres et 12 Roues Accouplées de la Compagnie de Chemins de Fer Départementaux.\* M. Comble. (38) Sept.  
 Les Locomotives à Voie Étroite.\* Henry Martin. (33) Serial beginning Sept. 12.

**Railroad, Street.**

- Production and Distribution of Alternating Current for Large City Systems.\* Richard McCulloch. (Paper read before the Amer. St. Ry. Assoc.) (17) Sept. 12; Abstract (15) Oct. 2.  
 Power Plant of the Ottawa Electric Railway.\* John Murphy. (27) Sept. 12.  
 Electric Welded Joints for Street Railway Tracks.\* William Pestell. (Paper read before Amer. St. Ry. Assoc.) (17) Sept. 12; Abstract (13) Sept. 17.  
 Section Seven, Division Three, of the New York Rapid Transit Railroad.\* (14) Sept. 19.  
 The Worcester & Holden Street Railway.\* (17) Sept. 19.  
 Gasolene Cars for Interurban Service.\* (17) Sept. 19.  
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 Denver Tramway System.\* (17) Oct. 10.  
 Les Transports en Commun de Paris et du Département de la Seine. J. Feugères. (35) Serial beginning Sept.

**Sanitary.**

- The Sanitary Disposal of Municipal Refuse: An Informal Discussion.\* (54) Vol. 50.  
 Gas for House Heating.\* Walton Forstall. (10) Oct.  
 Heating and Ventilating in the Carnegie Residence, New York.\* (14) Oct. 3.

**Structural.**

- Note on the Coefficient of Elasticity of Concrete and Mortar Beams during Flexure.\* Myron S. Falk, Jun. Am. Soc. C. E. (54) Vol. 50.  
 A New Safety Explosive. Richard T. Dana, Assoc. M. Am. Soc. C. E. (54) Vol. 50.  
 The Preservation of Materials of Construction: An Informal Discussion.\* (54) Vol. 50.  
 Sand-Blast Cleaning of Structural Steel.\* George W. Lilly, Assoc. M. Am. Soc. C. E. (54) Vol. 50.  
 American Railway Engineering and Maintenance of Way Association: Specifications for Portland and Natural Cements and Portland Cement and Concrete. (67) Sept.  
 The Inspection of Materials. (12) Serial beginning Sept. 4.  
 The Value of White Paints on Engineering Structures. (12) Sept. 4.  
 Early Iron Building Construction.\* (13) Sept. 10.  
 A Model Bridge and Construction Shop; Pennsylvania Steel Company's New Plant.\* (20) Serial beginning Sept. 10; (14) Serial beginning Sept. 26.  
 Lacquers and Paints for Metals. (12) Serial beginning Sept. 11.  
 Concrete Blocks for Building.\* (13) Sept. 17.  
 Structural Steel Work in the Macy Building, New York City.\* (14) Sept. 19.  
 Steel Building Construction in Gas-Works.\* Saml. Cutler, Jr. (Paper read before the Eastern Counties Gas Mgrs. Assoc.) (66) Sept. 22.  
 Pendulum Apparatus for Testing Steel as regards Brittleness.\* E. G. Izod. (Paper read before the British Assoc. for the Advancement of Science.) (11) Sept. 25.  
 Mixing and Placing Concrete.\* S. H. Lea, M. Am. Soc. C. E. (45) Serial beginning Oct.  
 The Twenty-three Story Land Title Building, Philadelphia, Pa.\* (14) Serial beginning Oct. 3.  
 Some Methods and Costs of Concrete Mixing on the Buffalo, N. Y., Breakwater.\* Emile Low, M. Am. Soc. C. E. (13) Oct. 8.  
 The New Building Regulations of New York City for Concrete-Steel Construction. (13) Oct. 8; (14) Oct. 10.  
 Laboratoire d'Essais du Conservatoire des Arts et Métiers: Section des Métaux.\* P. Breuil. (33) Serial beginning Sept. 5.

**Topographical.**

- Topographic Work in the Grand Canyon of the Gunnison. I. W. McConnell. (14) Oct. 3.

**Water Supply.**

- Notes on the Potable Waters of Mexico. Ellen H. Richards. (56) Vol. 32.  
 A Small Rock-Fill Dam.\* H. de B. Parsons, M. Am. Soc. C. E. (54) Vol. 50.



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- The Filtration Works of the East Jersey Water Company, at Little Falls, New Jersey. George W. Fuller, Assoc. M. Am. Soc. C. E. (54) Vol. 50.
- Water Treatment in Railroad Operation. G. R. Henderson. (61) Sept.
- Tangential Water-Wheel Efficiencies. (47) Sept. 12.
- Duty Trial of a Ten-Million Gallon Pumping Engine, at Cleveland, O. (14) Sept. 19.
- Further Results of the Water Waste Investigations in New York City. (14) Sept. 19; (13) Sept. 24.
- Water-Powers in the South; with Especial Reference to Those of Northern Georgia in the Neighborhood of Gainesville and Dahlonega.\* (45) Oct.
- Commercial Wrought Iron and Steel Pipe. Franklin Riddle, M. Am. Soc. C. E. (Paper read before the Pacific Coast Gas Assoc.) (13) Oct. 1; Abstract (20) Sept. 10.
- Intake Tunnel for the Champion Mill, at Painesdale, Mich.\* F. W. O'Neil, Jun. Am. Soc. M. E. (Abstract of Paper presented before the Lake Superior Min. Inst.) (13) Oct. 1.
- Progress Report of Commission on Additional Water Supply for New York City.\* (13) Oct. 1.
- The Correct Design and Stability of High Masonry Dams. Geo. Y. Wisner, M. Am. Soc. C. E. (Paper prepared for the 11th National Irrigation Cong.) (13) Oct. 1.
- On the Nature and Quality of Some Potable Waters in South-West Lancashire. J. Campbell Brown. (Paper read before the British Assoc. for the Advancement of Science.) (11) Oct. 2.
- Water-Softening Plant, Pennsylvania Co.\* (15) Oct. 2.
- Trial of a Diesel Oil Engine and Riedler Pump.\* Michael Longridge, M. Inst. C. E. (47) Oct. 3.
- Moving a 48-In. Force Main under Pressure at Philadelphia. Seth M. Van Loan, Jun. Am. Soc. C. E. (13) Oct. 8.
- Some Points in the Design of Buckets for Impulse Water-Wheels.\* (13) Oct. 8.
- The Pecos Valley Aqueduct.\* (40) Oct. 9.
- Sand Washers at the Roxborough Filters, Philadelphia.\* (14) Oct. 10.

**Waterways.**

- The Economic Improvement of the Coosa and Alabama Rivers, in Georgia and Alabama.\* D. M. Andrews, M. Am. Soc. C. E. (54) Vol. 50.
- The Development of the Commerce of the Great Lakes. (Presidential Address at the Annual Convention of the Amer. Soc. of Civ. Engrs.) Alfred Noble, Pres. Am. Soc. C. E. (54) Vol. 50.
- The Panama Canal.\* George S. Morison, M. Am. Soc. C. E. (54) Vol. 50.
- The Protection and Improvement of Foreshores by the Utilization of Tidal and Wave Action.\* R. G. Allanson-Winn, M. Inst. C. E., Ireland. (54) Vol. 50.
- An Alternative Line for the Nicaragua Canal; and a Proposed New Method of Dam Construction.\* J. Francis Le Baron, M. Am. Soc. C. E. (54) Vol. 50.
- Action of Sea Worms on Foundations in Boston Harbor.\* F. W. Hodgdon. (1) Aug.
- The Borings for the Bohio Dam for the Panama Canal.\* R. C. Smith. (4) Aug.
- Revolving Lanterns for Lighthouses.\* (46) Sept. 26.
- Controlling the Floods of the Mississippi River.\* Lewis M. Haupt. (3) Oct.
- Some Methods and Costs of Concrete Mixing on the Buffalo, N. Y., Breakwater.\* Emile Low, M. Am. Soc. C. E. (13) Oct. 8.
- Drague Marine Porteuse et à Refoulement pour les Ports de la Régence de Tunis.\* Ch. Dantin. (33) Aug. 29.

\* Illustrated.





## AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1852.

## PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

## SOCIETY AFFAIRS.

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## MINUTES OF MEETINGS.

## OF THE SOCIETY.

**November 4th, 1903.** The meeting was called to order at 8.40 p. m., President Noble in the chair; Chas. Warren Hunt, Secretary; and present, also, 92 members and 16 guests.

The minutes of the meetings of October 7th and 21st, 1903, were approved as printed in *Proceedings* for October, 1903.

A paper, by Eugen Goetze, Esq., entitled "Filtration for Public Water Supplies, with Especial Reference to the Double Filtration Plant at Bremen, Germany," was presented by Rudolph Hering, M. Am. Soc. C. E. A communication on the subject from W. Kiersted, M. Am. Soc. C. E., was presented by the Secretary, and the paper was discussed verbally by Messrs. H. W. Underwood and Morris Knowles.

who illustrated their remarks with lantern slides. Messrs. Allen Hazen, J. P. A. Maignen, George W. Fuller, William B. Fuller, John H. Gregory, George A. Soper and Thomas H. Wiggin also spoke on the subject.

Ballots for membership were canvassed, and the following candidates elected:

AS MEMBERS.

BURR BASSELL, Kernville, Cal.  
KORT BERLE, Washington, D. C.  
JOHN HOWARD CLARK, Malden, Mass.  
WALTER EDWARD DAUCHY, Chicago, Ill.  
JOHN ROSE WILSON DAVIS, Jersey City, N. J.  
CHARLES YOUNG DIXON, Amherstburg, Ont., Canada.  
HOWARD CARLETON HOLMES, San Francisco, Cal.  
FRANK GILBERT JONAH, Alice, Tex.  
ARTHUR LOUIS PHILLIPS, Memphis, Tenn.  
YSIDORO YGNACIO POLLEDO, Matanzas, Cuba.

AS ASSOCIATE MEMBERS.

WALTER HINDS ALLEN, Brooklyn, N. Y.  
ELMORE DAVID CUMMINGS, Chicago, Ill.  
ERASTUS ROLAND SIMPSON, Boston, Mass.,  
FRANK EDWARD WINSOR, New York City.

The Secretary announced the election of the following candidates by the Board of Direction, on November 3d, 1903:

AS ASSOCIATES.

WILLIAM CLARENCE OLDS, Erie, Pa.  
HERBERT SEDGWICK WILGUS, Brooklyn, N. Y.

AS JUNIORS.

BARNETT BRASLOW, New York City.  
EDWARD MERRIAM CHADBOURNE, San Francisco, Cal.  
JOHN WILLIAMS DOTY, New York City.  
JOSEPH THOMAS LILLICH, St. Louis, Mo.

The Secretary announced the death of ROBERT HENRY THURSTON, elected Member December 6th, 1871; died October 26th, 1903.

Adjourned.

**November 18th, 1903.**—The meeting was called to order at 8.40 p. m., President Noble in the chair; Chas. Warren Hunt, Secretary; and present, also, 102 members and 10 guests.

A paper, entitled "Dock Improvements at Liverpool," by George Cecil Kenyon, Assoc. M. Am. Soc. C. E., was presented by the Secretary.

The subject was discussed by the President.

The Secretary announced the death of NORMAN SMITH LATHAM, elected Junior July 3d, 1889; died November 10th, 1903.

Adjourned.

## OF THE BOARD OF DIRECTION.

(Abstract.)

**November 3d, 1903.**—President Noble in the Chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Briggs, Craven, Croes, Jackson, Osgood, Pegram, Schneider, Swain and Wilgus.

A report was received from the Committee of Conference on the proposed Joint Engineering Building, and action was taken authorizing a statement of the matter, as it stands, to be issued to the membership sixty days before the Annual Meeting.

The proposition for the appointment of a Special Committee on Concrete and Steel-Concrete was considered, and a Committee of the Board appointed to prepare its recommendations for presentation to the Annual Meeting, together with a statement of the arguments for and against the appointment of such Committee.

Reconsideration Ballots were canvassed in accordance with the Constitution.

Applications were considered and other routine business transacted.

Two candidates for admission as Associate, and four as Junior, were elected.\*

Adjourned.

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\* See page 408.

## ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

### MEETINGS.

**Wednesday, December 2d, 1903.**—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper, entitled "A Desirable Method of Dredging Channels through River Bars," by S. Maximoff, Assoc. M. Am. Soc. C. E., will be presented for discussion.

This paper was printed in *Proceedings* for October, 1903.

**Wednesday, December 16th, 1903.**—8.30 P. M.—At this meeting, a paper, by Emile Low, M. Am. Soc. C. E., entitled "The Breakwater at Buffalo, N. Y.," will be presented for discussion.

This paper is printed in this number of *Proceedings*.

### ANNUAL MEETING.

The Fifty-first Annual Meeting will be held at the Society House, January 20th and 21st, 1904. The Business Meeting will be called to order at 10 o'clock on Wednesday morning. The annual reports will be read, officers for the ensuing year elected, members of the Nominating Committee appointed, and other business transacted.

The arrangements for excursions and entertainments will be announced later.

### NOMINATING COMMITTEE.

The Constitution provides that at the Annual Meeting of each year, seven Corporate Members, not officers of the Society, one from each of the geographical districts, into which the Society is divided for this purpose, shall be appointed by the meeting to serve for two years.

The usual blank request for suggestions as to representatives of each district, for presentation to the meeting, will soon be mailed to Corporate Members.

### ANNUAL CONVENTION, 1904.

The Thirty-sixth Annual Convention will be held at St. Louis, Mo., during the week beginning October 3d, 1904.

As the details of the arrangements are developed, they will be announced in *Proceedings*.

**UNIVERSAL EXPOSITION, ST. LOUIS, 1904.**

The Society has undertaken to provide for an Engineering Exhibit, and the establishment of Headquarters for visiting engineers, and the Board of Direction has appropriated sufficient funds to defray the necessary expense.

This matter is in the hands of the following Committee:

ROBERT MOORE, M. Am. Soc. C. E., St. Louis, Mo., *Chairman*.

EDWARD C. CARTER, M. Am. Soc. C. E., Chicago, Ill.

MORDECAI T. ENDICOTT, M. Am. Soc. C. E., Washington, D. C.

JAMES L. FRAZIER, " " Frankfort, Ind.

WILLIAM JACKSON, " " Boston, Mass.

EMIL KUICHLING, " " New York, N. Y.

JOHN F. WALLACE, " " Chicago, Ill.

H. J. PFEIFER, Assoc. M. Am. Soc. C. E., St. Louis, Mo., *Secretary*.

**SEARCHES IN THE LIBRARY.**

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many such searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction to the members who have made use of the resources of the Society in this manner has been expressed frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling, compared to the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

Copies of all lists of references are filed, so that in many cases it is only necessary to make a typewritten copy, which reduces the cost of searches to a minimum.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.



## ACCESSIONS TO THE LIBRARY.

From October 14th to November 10th, 1903.

## DONATIONS.\*

## GRAPHIC STATICS, WITH APPLICATIONS TO TRUSSES, BEAMS AND ARCHES.

By Jerome Sondericker. Cloth, 9 x 6 ins., 8 + 137 pp., illus. New York, John Wiley & Sons, 1903. \$2.00.

This book is the outgrowth of an experience in teaching graphic statics at the Massachusetts Institute of Technology. While it deals specifically with problems encountered in building construction, it is intended to be serviceable to engineers and engineering students generally. As preparation, the author states that the reader should have a knowledge of statics and strength of materials, including beam stresses and deflections, as these subjects are commonly presented. An attempt has been made, in Chapter II, to develop a general method of dealing with frames where bending stresses occur in addition to tension and compression stresses. The Contents are: Introduction; Funicular Polygon; Forces in Equilibrium; Graphical Determination of Moments; Some Special Constructions for Funicular Polygons; Construction of Roofs, Loads, etc.; Determination of Reactions of Supports; Determination of Stresses; Counterbracing and Double Systems of Bracing; Three-Hinged Arch; Bending Stresses, Sway Bracing; Shearing Force and Bending Moment of Beams; Deflection of Beams; General Conditions of Stability of Masonry Arches, Abutments, etc.; Masonry Arch, Line of Pressure; Abutments, Piers, etc.

## WATER POWER.

An Outline of the Development and Application of the Energy of Flowing Water. By Joseph P. Frizell, M. Am. Soc. C. E. Third Edition, Enlarged. Cloth, 9 x 6 ins., 6 + 646 pp., illus. New York, John Wiley & Sons, 1903. \$5.00. (Donated by the Author.)

In this edition some typographical and numerical errors which had crept into former editions have been eliminated. The subject of dams on soft bottom has been extended, and a section added on dams in tidal waters. The length of wasteways in relation to the appurtenant drainage area has been more fully considered. The subject of tidal power has been outlined, and extended attention has been given to storage reservoirs. The subject of leases and rentals of water-power and land appurtenant thereto has also been more fully elaborated. The Contents are: Natural Watercourses; Dams for Water-Power; Construction of Dams; Dams of Masonry; Appendages of Dams; Movable Dams; Storage-Reservoirs and Reservoir Dams; Rock-Fill Dams; Reservoir Dams of Masonry; Examples of High Dams; Failures of High Dams; Canals, Gates, etc.; Hydraulic Motors; Water-Wheels; Turbines; Appendages and Attachments of Turbines; Canals; Development of Natural Water-Powers; Transmission of Power; Shafting and Wire Rope; Hydraulic Transmission; Transmission by Compressed Air; Transmission by Electric Current; The Power-House; Measurement of Water; Storage and Pondage of Water; Damages to Mill-Owners Resulting from the Diversion of Water; Leases and Rentals of Water-Power; Testing Water-Wheels. There is an index of six pages.

## PRINCIPLES OF AMERICAN FORESTRY.

By Samuel B. Green. Cloth, 7 x 5 ins., 13 + 334 pp., illus. New York, John Wiley & Sons, 1903. \$1.50.

The author states that this is a book on elementary forestry, and has been prepared especially for students and others beginning this subject. It is also intended for the general reader who wishes to secure a general idea of the subject of forestry in North America. Much of the matter included herein was originally published by the Geological and Natural History Survey of Minnesota under the title "Forestry in Minnesota." In this volume the matter is treated in a more general way and has been enlarged upon the better to adapt it to the whole country. The chapter headings are: The Tree; Tree Growth; The Forest; Forest Influences; Tree Planting on Prairies; Forest Regeneration; Propagation; Nursery Practice; Forest Protection; Rate of Increase in Timber Trees; Forest Mensuration; Forest Problems; The Uses of Wood; Durability of Wood; Forest Economics; Tabular Classification, Sylvicultural Data, and Uses of Important American Timber Trees; Glossary of Technical Terms Used in Forestry; A List of the Best Books on Forestry; Publications of the Bureau of Forestry and Other U. S. Departments of Special Interest to Students. There is an index of twelve pages.

\* Unless otherwise specified, books in this list have been donated by the publishers.

**NOTES ON ELECTRIC RAILWAY ECONOMICS AND PRELIMINARY ENGINEERING.**

By W. C. Gotshall, M. Am. Soc. C. E., M. Am. Inst. E. E. Cloth, 9 x 6 ins., 5 + 251 pp., illus. New York, McGraw Publishing Company, 1903. \$2.00.

This book is based upon a series of lectures delivered at Lehigh University, the subject of which dealt with the economics of the preliminary determinations and of the construction and operation of high-speed interurban electric railroads. The author has filled out the lecture notes, in some places adding matter thereto, and has arranged the subjects so as to follow the order in which they would be taken up in the investigation and construction of an electric railway undertaking of the type considered. With a few exceptions all the full-size original drawings and diagrams used in the lectures have been reproduced in this volume. Part of the book is devoted to a statement of the principles which should be followed in locating a proposed route so as to derive the maximum benefit from the territory to be served. The book is not designed as a treatise or exhaustive treatment of the subject as a whole, or of the details as indicated in the chapter headings. It is intended to "point the way," and embody some of the results of twelve years of practice and application. The Contents are: Introductory; Preliminary Office Determinations; Preliminary Field Survey; Detailed Office Investigation of Track Location; Preliminary Determination of Schedules and Equipment; Estimate of Earnings; Estimate of Probable Operating Expenses; The Final Survey; Track Construction; Overhead or Third-Rail Construction; The Power Station; Storage Batteries; Rolling Stock and Motors; Securing Rights of Way; Preparation of the Specifications; The Construction Period; The Organization of the Operating Department; Economic Considerations; Appendix. There is an index of three pages.

**L. VICAT, SA VIE ET SES TRAVAUX.**

Avec des Notes par Merceron-Vicat. Paper, 9 x 5 ins., 243 pp. Paris, Veuve Ch. Dunod, 1903. 3 francs, 50 centimes.

In this book M. Merceron-Vicat has recalled opportunely, at a time when the cement industry has become of considerable importance, the works of the creator of this new industry. The technical details are still of present-day interest and may be found useful by engineers and builders who are interested in hydraulic limes and cements. There is a short biographical notice followed by extracts showing L. Vicat's principal discoveries. The Contents are: Notice biographique; Chaux hydrauliques artificielles; Classification des chaux hydrauliques; Chaux-limites et incuits; Pozzolanes artificielles; Ciments éventés et sureuits; Action de l'eau de mer; Délibération du Conseil municipal de Paris; Rapport d'Arago; Rapport de Thénard; Rapport de J. B. Dumas.

**A MANUAL OF LAND SURVEYING.**

Comprising an Elementary Course of Practice with Instruments and a Treatise upon the Survey of Public and Private Lands, Prepared for Use of Schools and Surveyors. By F. Hodgman. Morocco, 7 x 4 ins., 11 + 394 + 6 + 106 pp., illus. Climax, Michigan, F. Hodgman, 1903. \$3.00.

This book contains the mathematical and instrumental matter usually found in text-books as well as a large amount of practical matter. It gives the United States laws relating to surveys and the latest United States Instructions to Deputy Surveyors. It tells how to subdivide sections of the United States Surveys and how to find lost corners and restore them when obliterated or destroyed. It also tells how descriptions in deeds are to be constructed and how to write correct descriptions. There are legal decisions and citations of more than two hundred cases from the highest courts in the United States, covering every point in the surveyor's practice which has been settled by them. In preparing this part of the work, every decision of the Supreme Court of the United States and of the Supreme Courts of the several States, which had a bearing on the surveyor's work, was consulted. The Contents are: Definitions; Instruments; Measurement of Angles; Passing Obstacles and Measuring inaccessible Distances; Platting and Computing Areas; Curvilinear Surveying; Original Surveys; Subdivision of Sections; Resurveys; Relocating Lost Corners; Miscellaneous; Tables.

**THE STAR IMPROVED STEAM ENGINE INDICATOR.**

By Geo. H. Barrus, M. Am. Soc. M. E. Cloth, 7½ x 5 ins., 140 pp., illus. Boston, Star Brass Mfg. Co. \$1.00.

The preface states that although in a sense an advertisement of the new indicator, this book is intended to be an unbiased statement of all the facts needed by a purchaser of this indicator, whether unfamiliar with the particular form of instrument described, or with the general subject. It is intended also as a useful book of reference and instruction in the practical work of indicating. Most of the diagrams here reproduced were taken for the purpose of this treatise, using one of the new type of instruments.

and nearly all were taken by the author. The Contents are: Introduction; Description of the Star Improved Indicator; Testing Springs; Care of the Star Improved Indicator; Diagrams Taken from the Star Improved Indicator; How to Indicate an Engine; How to Take a Diagram; Designation of the Various Lines of the Diagram; Use of the Indicator for Setting Valves; Working up Diagrams; Use of the Planimeter, etc.; Computation of Horse-Power; Steam Accounted for by Indicator Diagram; Cylinder Condensation and Leakage; Combining Diagrams; Steam-Pipe Diagrams; Leakage-Tests of Valves and Pistons; Tables.

#### CURVES OF CIVIL ENGINEERING.

The Transitman's Pocket Companion. Containing Instructions for Surveys to Locate the Center Line of Engineering Works, and Tables that are Needed in the Field, in Connection with Circular, Transition and Vertical Curves. By Arthur M. Haynes. Leather, 7 x 4 ins., 117 pp., illus. 1903. \$2.50. (Donated by the Author.)

The author states in the preface that the excuse for this book is to advocate *arc* measurements. A new table of  $1^\circ$  curve functions is given, in accordance with a new definition for "degree of curve," found in the first paragraph of the text. Logarithms and tables of natural functions are not given because the author thinks they should not be used in the field. Special problems, too, are considered as belonging in the classroom. The subject of transition curves is made a prominent feature. A section on vertical curves is added, so that the ground may be better covered. While this subject applies especially to railroads it should also be applied to city street grades much more than it is. The Contents are: Circular Curves; Alignments of Engineering Works; Linear Measurements; General Discipline; Angular Measurements; True Meridian; Field Work; Transition Curves; Platting; Turnout Curves; Vertical Curves; Tables and Diagrams.

#### AMERICAN RAILWAY TRANSPORTATION.

By Emory R. Johnson. Cloth, 8 x 5 ins., 16 + 434 pp., illus. New York, D. Appleton and Company, 1903. \$1.50.

This volume, as is stated in the introductory chapter, is concerned with the transportation service performed by steam or trunk-line railroads. It does not discuss the engineering and other technical questions of railroad construction and operation, but describes the American railroad system, gives an account of the service performed by the different branches of the railroad organization, considers the business relations of the railroads and the public, and discusses the problems of government regulation. The book is intended as a study in railway economics and as an introduction to the general subject of railroad transportation. The chapter headings are: Introduction—Definition and Scope of Transportation; Origin of the American Railway; Growth of the American Railway Net; The Mechanism of the Railway; The Present Railway System of the United States; The Railway Corporation and its Charter; Railway Capital; Earnings, Expenses, and Dividends; The Freight Service; The Passenger Service; The Express Service of the Railways; The Mail Service of the Railways; The Organization of the Service; The Accounts and Statistics of the Railway Service; Railway Competition and Agreements to Maintain Rates; Pools and Traffic Associations; The Present Situation; Monopoly and Competition in the Railway Service; Theory of Rates and Fares; Rate-Making in Practice; Railway Charges in the United States and other Countries; Public Aid to Railway Construction; Relation of the Railways to the State in the United Kingdom and France; Relations of the Railways and the State in Italy and Germany; Regulation of Railways by the American State Governments; Railway Regulation by the Federal Government; The Courts and Railway Regulation; Railway Taxation; The Problem of Government Regulation. There is an index of six pages.

#### AMERICAN RAILWAYS.

By Edwin A. Pratt. Reprinted (with additions) from *The Times*. Cloth, 8 x 5 ins., 8 + 307 pp. New York, The Macmillan Company, 1903. \$1.25.

The facts here given were collected during a four months tour of the United States, made in the winter of 1902-3, and representing a total about 9,000 miles of railway traveling on the American continent. While seeking to put before the representatives of railway interests in England a certain amount of practical information which might be of service to them, the author has also aimed at interesting the general reader in the subject of American railways, in regard alike to their origin, their characteristics, and their operation. He has also incorporated some references to the present-day expansion of those agricultural, industrial, and commercial interests of the United States to which, more than to passenger traffic, the railways of the United States are indebted for their prosperity. The chapter headings are: A General Survey; Some Points of Difference; The Growth of Freight; Wagons and Locomotives; The Passenger Business; On the Cars; The Pittsburg Block; Track Elevation in Chicago; Across the



Prairies; In the Rockies; A Mining Camp Railway in Chicago; The Santa Fé Trail; The Trans-Continental Traffic; Gardens, Deserts, and the New Galveston; Progress in the South; The North-West and Its Story; The New England States; Railway Accidents in the United States.

# FOWLER'S MECHANICAL ENGINEER'S POCKET BOOK, 1904.

Edited by William H. Fowler, M. Inst. C. E., M. I. Mech. E. Leatherette, 6 x 4 ins., 95 + 441 pp., illus. Scientific Publishing Co., Manchester. 1 shilling, 6 pence, net.

Advantage has again been taken in the preparation of the 1904 edition of this pocket-book to revise its contents in order to bring the matter up to date and correct any typographical errors not previously detected. In several directions this work of revision and addition has assumed considerable dimensions, and it is hoped that it will prove of corresponding value. The section on gas engines has been largely rewritten with the intention of making it of special value to all interested in gas engine design and practice. There is an index of seventeen pages.

Gifts have also been received from the following:

- |   |  |
|---|--|
| Ala.—Geological Surv. 1 pam.                              | Inst. of Civ. Engrs. 1 bound vol., 2 vol.                        |
| Albemarle & Chesapeake Canal Co. 1 bound vol.             | Iowa—Geological Surv. 1 bound vol.                               |
| Am. Ry. Master Mechanics' Assoc. 1 bound vol.             | <i>Journal of the U. S. Artillery.</i> 1 pam.                    |
| Am. St. Ry. Assoc. 1 vol.                                 | Lake Mohonk Conference on International Arbitration. 1 pam.      |
| Am. Water-Works Assoc. 1 vol.                             | Lehigh Valley R. R. Co. 3 pam.                                   |
| Architekten-Verein zu Berlin. 2 pam.                      | Louisville & Nashville R. R. Co. 1 pam.                          |
| Atlanta & West Point R. R. Co. 1 pam.                     | Maine—State Board of Health. 6 bound vol., 5 vol.                |
| Boston, Mass.—Pub. Lib. 1 vol.                            | Md—State Board of Health. 4 vol.                                 |
| Buffalo, Rochester & Pittsburgh Ry. Co. 1 pam.            | Mass.—Bureau of Statistics of Labor. 2 bound vol.                |
| Butler, D. B. 1 pam.                                      | Mead, Elwood. 1 bound vol.                                       |
| Canadian Pacific Ry. Co. 1 pam.                           | Montclair, N. J.—Board of Health. 1 pam.                         |
| Cantor, Jacob A. 2 pam.                                   | Montreal, Que.—Supt. of Water-Works. 1 pam.                      |
| Central of Georgia Ry. Co. 1 pam.                         | N. H.—R. R. Commrs. 5 vol.                                       |
| Central R. R. Co. of N. J. 1 pam.                         | N. J.—Geological Surv. 1 pam.                                    |
| Chicago & Alton Ry. Co. 1 pam.                            | New London, Conn.—Board of Water Commrs. 1 pam.                  |
| Chicago, Burlington & Quincy R. R. Co. 1 pam.             | N. Y.—Commr. of the State Reservation at Niagara. 5 pam.         |
| Chicago, Milwaukee & St. Paul Ry. Co. 1 pam.              | N. Y.—Comptroller. 7 bound vol., 24 pam.                         |
| Chicago, Rock Island & Pacific Ry. Co. 1 pam.             | N. Y.—Forest, Fish & Game Comm. 1 pam.                           |
| <i>City Record.</i> 2 bound vol.                          | N. Y.—Pub. Lib. 1 pam.   |
| Cleveland, Cincinnati, Chicago & St. Louis Ry. Co. 1 pam. | New York Central & Hudson River R. R. Co. 1 pam.                 |
| Colby, Albert Ladd. 1 pam.                                | New York, New Haven & Hartford R. R. Co. 2 pam.                  |
| Colorado & Southern Ry. Co. 1 pam.                        | New York, Ontario & Western Ry. Co. 2 pam.                       |
| Conn.—Agri. Exper. Station. 1 pam.                        | New York, Susquehanna & Western R. R. Co. 1 pam.                 |
| Corthell, E. L. 1 bound vol.                              | Norfolk, Va.—Board of Water Commrs. 1 pam.                       |
| Crandall, C. L. 1 pam.                                    | North of England Inst. of Min. and Mech. Engrs. 1 pam.           |
| Denver & Rio Grande R. R. Co. 2 pam.                      | North-East Coast, Inst. of Engrs. and Shipbuilders. 1 bound vol. |
| Detroit, Mich.—Dept. of Pub. Works. 1 bound vol.          | Ogdensburg, N. Y.—City Clerk. 1 pam.                             |
| Duluth, Minn.—City Officers. 1 vol.                       | Ohio—Commr. of Railroads & Telegraphs. 1 bound vol.              |
| Eng. Soc. Polytechnic Inst. of Brooklyn. 1 bound vol.     | Parsons, Wm. Barclay. 2 bound vol.                               |
| Eng. Soc. School of Practical Sci., Toronto. 2 vol.       | Queensland—Commr. for Ry. 1 pam.                                 |
| Erie R. R. Co. 1 pam.                                     | Reading Co. 2 pam.   |
| Fisk, W. L. 2 pam., 1 map.                                | Rock Island Co. 1 pam.   |
| Fitchburg, Mass.—City Clerk. 16 bound vol., 2 vol.        | Ruttan, H. N. 1 pam.   |
| Fort Worth & Denver City Ry. Co. 1 pam.                   | Santa Fé, Prescott & Phoenix Ry. Co. 1 pam.                      |
| Grand Rapids, Mich.—City Engr. 1 pam.                     | Smithsonian Inst. 2 bound vol.                                   |
| Great Britain—Patent Office. 7 vol., 4 pam.               | Southern Ry. Co. 2 pam.  |
| Great Northern Ry. Co. 2 pam.                             | Spring, F. J. E. 1 pam.  |
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**Continuous Current Dynamos and Motors and their Control.** Being a Series of Articles Reprinted from *The Practical Engineer*, and completed by W. R. Kelsey. London, The Technical Publishing Company, Limited, 1903.

**Electrical Influence Machines;** Their Historical Development and Modern Forms, with Instructions for Making Them. By John Gray. Second Edition. Revised and Enlarged. New York, D. Van Nostrand Company, 1903.

**Das Elektrische Kabel.** Eine Darstellung der Grundlagen für Fabrikation, Verlegung und Betrieb. Von C. Baur. Berlin, Julius Springer, 1903.

**Modern Practical Electricity.** Electricity in the Service of Man. A Popular and Practical Treatise on the Applications of Electricity in Modern Life. By R. Mullineux Walmsley. Vol. 1-3. Chicago, W. T. Keener & Co.

**The "Engineering" and Electric Traction Pocket-Book.** By Philip Dawson, Assoc. M. Inst. C. E., M. I. Mech. E., M. I. E. E. London, Offices of "Engineering." New York, John Wiley and Sons, 1903.

**Mechanics of Engineering.** Theoretical Mechanics, with an Introduction to the Calculus. Designed as a Text-Book for Technical Schools and Colleges, and for the Use of Engineers, Architects, etc. By Julius Weisbach. Translated from the Fourth Augmented and Improved German Edition, by Eckley B. Cox. Ninth American Edition. New York, D. Van Nostrand Company, 1899.

**Mechanics of Engineering and of Machinery.** By Julius Weisbach. Vol. II, Section II, Part II. Translated from the Fourth Augmented and Improved German Edition by A. Jay Du Bois, with Additions Showing American Practice by R. H. Buel; Vol. III, Pt. I, Sections I-II. Second Edition, Thoroughly Revised and Enlarged by Gustav Herrmann, Translated by J. F. Klein. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1896-1902.

**The Gas-Engine.** A Treatise on the Internal-Combustion Engine Using Gas, Gasoline, Kerosene, or other Hydrocarbon as Source of Energy. By Frederick Rensen Hutton. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1903.

**The Practical Physics of the Modern Steam Boiler.** By Frederick J. Rowan, A. M. Inst. C. E., M. I. E. S. With a Preface by Prof. R. H. Thurston. New York, D. Van Nostrand Company, 1903.



**Lead-Smelting.** The Construction, Equipment and Operation of Lead Blast Furnaces, and Observations on the Influence of Metallic Elements on Slags and the Scientific Handling of Smoke. By Malvern Wells Iles. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1902.

**The Mineral Industry ; Its Statistics, Technology and Trade in the United States and other Countries to the End of 1902.** Founded by the late Richard P. Rothwell. Edited by Joseph Struthers. Vol. XI Supplementing Volumes I to X. New York and London, *The Engineering and Mining Journal*, 1903.

**House Drainage Manual.** A Guide to the Design and Construction of Systems of Drainage and Sewage Disposal from Houses. By Wm. Spinks, Assoc. M. Inst. C. E. Second Edition, Revised and Extended by E. H. Blake. With Tables, Illustrations, Extracts from Public Health Acts, Metropolis Management Acts, and Model By-Laws Relating to House Drainage. Biggs & Co., London; D. Van Nostrand Company, New York, 1903.

**Die Angewandte Elastizitäts- und Festigkeitslehre.** Auf Grund der Erfahrung bearbeitet von L. v. Tetmajer. Zweite, vollständig umgearbeitete Auflage. Leipzig und Wien, Franz Deuticke, 1904.

**Die Gesetze der Knickungs- und der Zusammengesetzten Druckfestigkeit der technisch wichtigsten Baustoffe.** Bearbeitet von L. v. Tetmajer. Dritte vervollständigte Auflage. Leipzig und Wien, 1903.

SUMMARY OF ACCESSIONS.

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## MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(October 14th to November 10th, 1903.)

NOTE. — This list is published for the purpose of placing before the members of the Society the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.

### LIST OF PUBLICATIONS.

In the subjoined list of articles references are given by the number prefixed to each journal in this list.

- (1) *Journal, Assoc. Eng. Soc.*, 257 South Fourth St., Philadelphia, Pa., 30c.
- (2) *Proceedings, Engng. Club of Phila.*, 1122 Girard St., Philadelphia, Pa.
- (3) *Journal, Franklin Inst.*, Philadelphia, Pa., 50c.
- (4) *Journal, Western Soc. of Engrs.*, Monadnock Block, Chicago, Ill.
- (5) *Transactions, Can. Soc. C. E.*, Montreal, Que., Canada.
- (6) *School of Mines Quarterly*, Columbia Univ., New York City, 50c.
- (7) *Technology Quarterly*, Mass. Inst. Tech., Boston, Mass., 75c.
- (8) *Stevens Institute Indicator*, Stevens Inst., Hoboken, N. J., 50c.
- (9) *Engineering Magazine*, New York City, 25c.
- (10) *Cassier's Magazine*, New York City, 25c.
- (11) *Engineering* (London), W. H. Wiley, New York City, 25c.
- (12) *The Engineer* (London), International News Co., New York City, 35c.
- (13) *Engineering News*, New York City, 15c.
- (14) *The Engineering Record*, New York City, 12c.
- (15) *Railroad Gazette*, New York City, 10c.
- (16) *Engineering and Mining Journal*, New York City, 15c.
- (17) *Street Railway Journal*, New York City, 35c.
- (18) *Railway and Engineering Review*, Chicago, Ill., 10c.
- (19) *Scientific American Supplement*, New York City, 10c.
- (20) *Iron Age*, New York City, 10c.
- (21) *Railway Engineer*, London, England, 25c.
- (22) *Iron and Coal Trades Review*, London, England, 25c.
- (23) *Bulletin, American Iron and Steel Assoc.*, Philadelphia, Pa.
- (24) *American Gas Light Journal*, New York City, 10c.
- (25) *American Engineer*, New York City, 20c.
- (26) *Electrical Review*, London, England.
- (27) *Electrical World and Engineer*, New York City, 10c.
- (28) *Journal, New England Water-Works Assoc.*, Boston, \$1.
- (29) *Journal, Society of Arts*, London, England, 15c.
- (30) *Annales des Travaux Publics de Belgique*, Brussels, Belgium.
- (31) *Annales de l'Assoc. des Ing. Sortis des École Spéciales de Gand*, Brussels, Belgium.
- (32) *Mémoires et Compte Rendu des Travaux*, Soc. Ing. Civ. de France, Paris, France.
- (33) *Le Génie Civil*, Paris, France.
- (34) *Portefeuille Économique des Machines*, Paris, France.
- (35) *Nouvelles Annales de la Construction*, Paris, France.
- (36) *La Revue Technique*, Paris, France.
- (37) *Revue de Mécanique*, Paris, France.
- (38) *Revue Générale des Chemins de Fer et des Tramways*, Paris, France.
- (39) *Railway Master Mechanic*, Chicago, Ill., 10c.
- (40) *Railway Age*, Chicago, Ill., 10c.
- (41) *Modern Machinery*, Chicago, Ill., 10c.
- (42) *Transactions, Am. Inst. Elec. Engrs.*, New York City, 50c.
- (43) *Annales des Ponts et Chaussées*, Paris, France.
- (44) *Journal, Military Service Institution*, Governor's Island, New York Harbor, 50c.
- (45) *Mines and Minerals*, Scranton, Pa., 20c.
- (46) *Scientific American*, New York City, 8c.
- (47) *Mechanical Engineer*, Manchester, England.
- (48) *Transactions, Am. Soc. C. E.*, New York City, \$5.
- (49) *Transactions, Am. Soc. M. E.*, New York City, \$10.
- (50) *Transactions, Am. Inst. Min. Engrs.*, New York City, \$5.
- (51) *Colliery Guardian*, London, England.
- (52) *Proceedings, Eng. Soc. W. Pa.*, 410 Penn Ave., Pittsburgh, Pa., 50c.
- (53) *Transactions, Mining Inst. of Scotland*, London and Newcastle-upon-Tyne.
- (54) *Municipal Engineering*, Indianapolis, Ind., 25c.
- (55) *Proceedings, Western Railway Club*, 225 Dearborn St., Chicago, Ill., 25c.
- (56) *American Manufacturer and Iron World*, 59 Ninth St., Pittsburgh, Pa.
- (57) *Minutes of Proceedings, Inst. C. E.*, London, England.
- (58) *Power*, New York City, 20c.
- (59) *Official Proceedings, New York Railroad Club*, Brooklyn, N. Y., 15c.
- (60) *Journal of Gas Lighting*, London, England, 15c.
- (61) *Cement and Engineering News*, Chicago, Ill., 25c.
- (62) *Mining Journal*, London, England.
- (63) *Mill Owners*, New York City, 10c.
- (64) *Engineering Review*, New York City, 10c.
- (65) *Journal, Iron and Steel Inst.*, London, England.

## LIST OF ARTICLES.

## Bridge.

- The Burnett and Kennedy Bridges, Bundaberg, Queensland.\* Alfred Joseph Goldsmith M. Inst. C. E. (63) Vol. 155.  
 Building the Cabul River Bridge in India. (14) Oct. 17.  
 The Adda Railway Bridge in Italy.\* (14) Oct. 17.  
 The Concrete Viaduct near Riverside, Cal.; San Pedro, Los Angeles and Salt Lake R. R. A. C. Ostrom. (13) Oct. 22.  
 A Novel Type of Drawbridge.\* (13) Oct. 22.  
 Novel Method of Erection Adopted for the Frans Bridge at Villefranche over the Saône.\* (13) Oct. 22.  
 A New High Level Bridge over the River Tyne at Newcastle, on the Northeastern Railway of England.\* F. E. Harrison. (40) Oct. 23.  
 A Movable Railway Incline Bridge at New Orleans.\* (14) Oct. 24.  
 Falsework for Rocky Bottoms in Rapid Currents.\* (Abstract of Report of a Committee to the Assoc. of Ry. Supts. of Bridges and Bldgs.) (18) Serial beginning Oct. 24.  
 Flood Damage to Bridges at Paterson, N. J.\* (13) Oct. 29.  
 Methods of Making Annual Inspection of Bridges and Culverts. (Abstract of Report of Committee of the Assoc. of Ry. Supts. of Bridges and Bldgs.) (13) Oct. 29.  
 The Kansas City Flow-Line Bridge Repairs.\* J. A. L. Waddell, M. Am. Soc. C. E. (13) Oct. 29; (14) Oct. 31; (15) Oct. 30.  
 Temporary Arrangement to Carry Traffic where One Arm of a Drawbridge is Wrecked.\* (Abstract of Report of a Committee to the Assoc. of Ry. Supts. of Bridges and Bldgs.) (18) Oct. 31.  
 A Concrete Arch Bridge near Mechanicsville, N. Y.\* (13) Nov. 5.  
 Erection of the Grand Rapids Bridge.\* (14) Nov. 7.  
 Calcul d'un Arc de Forme Quelconque; Exposé de la Méthode de de Dion dans Toute Sa Généralité Suivi d'une Application Numérique.\* L. Lemaire. (30) Oct.  
 Reconstruction du Pont de Frans sur la Saône, à Villefranche.\* (33) Oct. 31.

## Electrical.

- Reverse Current Circuit Breakers and the Protection of Transmission Lines.\* Leonard Wilson. (42) Aug.  
 Methods of Bringing High Tension Conductors into Buildings.\* C. E. Skinner. (42) Aug.  
 The Grounded Wire as a Protection against Lightning. Ralph D. Mershon. (42) Aug.  
 The Testing of Electrical Apparatus for Dielectric Strength. P. H. Thomas. (42) Aug.  
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 Storage Battery Industrial Locomotives.\* F. L. Sessions. (42) Aug.  
 Energy Transformations in the Synchronous Converter. Wm. S. Franklin. (42) Aug.  
 Commercial Alternator Design.\* W. L. Waters. (42) Aug.  
 Electric Power in Mill and Factory.\* Charles W. Startzman. (60) Serial beginning Oct.  
 Electric Shipbuilding Cranes at Kiel.\* (12) Oct. 9.  
 On Single-Phase Repulsion Motors. William Cramp. (Paper read before the British Assoc. for the Advancement of Science.) (11) Oct. 9.  
 The Glasgow Municipal Telephone System. (26) Serial beginning Oct. 9.  
 The Bexley Electric Lighting and Tramway Undertaking.\* (26) Oct. 9.  
 Experiments for Improving the Construction of Practical Standards for Electrical Measurements. (Report of Committee of the British Assoc. for the Advancement of Science.) (26) Serial beginning Oct. 9.  
 The Parallel Working of Alternators. B. Hopkinson. (Abstract of paper read before the British Assoc. for the Advancement of Science.) (26) Oct. 9.  
 Electric Light and Power Engineering.\* (47) Serial beginning Oct. 10.  
 The First Transmission of Energy in Europe by Means of Triphase Currents.\* Emile Guarini. (19) Oct. 17.  
 The Electric Light and Power Situation in St. Louis.\* (27) Oct. 17.  
 The Co-Operative Telephone Company's System at Detroit, Mich.\* (27) Oct. 17.  
 A Combined Street Railway and Lighting Plant at Muskegon, Mich.\* (14) Oct. 17.  
 Practical Examples with the Calculator Board: Series I, Notes for Submarine Cable Staffs.\* Edward Raymond-Barker. (26) Serial beginning Oct. 23.  
 Transmission of Hudson River Power.\* (27) Serial beginning Oct. 24.  
 On the Mechanism of Electric Power Transmission. A. E. Kennelly. (27) Oct. 24.  
 The Stone Wireless Telegraph System. Louis Duncan. (27) Oct. 24.  
 Photometric Tests of the Nernst Lamp.\* (27) Oct. 24.  
 Alternating Current Generators at Preston.\* (11) Oct. 30; (12) Oct. 30; (26) Oct. 30; (57) Oct. 30.

\*Illustrated.

**Electrical—(Continued).**

- Steam Turbo-Electric Generating Plants. George Wilkinson. (Paper read before the Inst. of Elec. Engrs.) (47) Serial beginning Oct. 31; Abstract (26) Oct. 30.
- An Improved Method of Testing Large Alternators under Full Load Conditions. B. A. Behrend. (27) Oct. 31.
- Notes on Certain Three-Wire Systems.\* Charles T. Mosman. (Paper read before the Ohio Elec. Light Assoc.) (27) Oct. 31.
- Motors in an Elevator Factory and Machine Shop.\* (27) Oct. 31.
- Motor Driven Machine Tools.\* (25) Nov.
- Electric Searchlights: Their Use Afloat and Ashore.\* Frank C. Perkins. (10) Nov.
- The Care of Switchboards.\* Edwin W. Creed. (64) Nov.
- Some Practical Points in the Design of Direct-Current Dynamo-Electric Machines.\* Cecil P. Poole. (3) Nov.
- Static Discharges in Electric Circuits. Percy H. Thomas. (3) Nov.
- Factory Turbo-Generator and Electric Power Distributing Plant.\* (27) Nov. 7.
- Dublin Three-Phase Central Station.\* (27) Nov. 7.
- The Electrical Drive for Machine Tools. Robert Lozier. (27) Nov. 7.
- The Steam Turbine Installation of the B. F. Goodrich Company.\* (14) Nov. 7.
- Appareil Électrique pour le Chargement des Cornues à Gaz: Système P. Sarraasin. (34) Oct.
- Installation Électrique des Hauts Fourneaux de la Société *Elba*.\* (33) Oct. 24.

**Marine.**

- The Latest Battleships for the United States Navy.\* (46) Oct. 17.
- The Imperial German Navy.\* Archibald S. Hurd. (10) Nov.
- The Steamship of the Future, Greater Safety, Comfort, Size and Speed.\* Stephen P. M. Lasker. (10) Nov.
- Bassin de Radoub de la Compagnie des Chantiers Kawasaki, à Kobé (Japon).\* (35) Oct.
- Le Paquebot *Kaiser Wilhelm II*.\* J. Bousquet. (33) Serial beginning Oct. 3.
- Les Moteurs à Pétrole à Bord des Voiliers de Pêche. C. Birault. (33) Oct. 31.

**Mechanical.**

- Mechanical Handling of Material.\* George Frederick Zimmer, Assoc. M. Inst. C. E. (63) Vol. 153.
- Design of Sheaves and Drums for Wire Rope. Samuel Diescher. (58) Sept.
- High Grade Wire Rope. L. C. Moore. (58) Sept.
- Timber Treating Plants.\* W. W. Curtis. (4) Oct.
- A Consideration of the Gaseous Fuel Problem. Henry G. Morris. (2) Oct.
- Air Separation of Cement—Description of Apparatus.\* W. Michaelis, Jr. (67) Oct.
- The Industrial Haulage System.\* Hroff Wesby. (60) Oct.
- Constructional Details and Costs of Recent Extensions (1900-1902), with Notes on Working Results, at the Tynemouth Gas Works, North Shields.\* A. Clement Hovey. (Paper presented to the North of England Gas Mgrs. Assoc.) (66) Oct. 6.
- The Little Retort-Charging Machines.\* (66) Oct. 6.
- Borsigs Works.\* (11) Serial beginning Oct. 9.
- On the Design and Testing of Centrifugal Fans for Induced Draught and Other Purposes. W. Gilbert, A. M. I. C. E. (Paper read before the Civil and Mech. Engrs. Soc.) (11) Oct. 9.
- A Simplified Method of Gas Purification to Completely Recover Tar and Ammonia.\* (66) Oct. 13.
- Manufacture and Uses of Carborundum. F. A. J. Fitzgerald. (Paper read before the Philadelphia Foundrymen's Assoc.) (20) Oct. 15.
- Mechanical Road Vehicles. W. Worby Beaumont, M. Inst. C. E. (20) Serial beginning Oct. 16.
- Hydraulic Coal Hoist at Glasgow Harbour.\* (12) Oct. 16.
- Wrightson's Patent Coal Shipper.\* (57) Oct. 16.
- A 66 Foot Vertical Boring Machine.\* (12) Oct. 16.
- Commercial Wrought-Iron and Steel Pipe. Franklin Riddle, M. Am. Soc. C. E. (Abstract of Paper read before the Pacific Coast Gas Assoc.) (47) Oct. 17.
- Developments in Automobile Construction. T. Clarkson. (Paper read before the British Assoc. for the Advancement of Science.) (47) Serial beginning Oct. 17.
- Notes on the Construction of Inclined Retort Settings.\* Archd. S. B. Little. (66) Serial beginning Oct. 20.
- Modernizing a Large Foundry.\* (20) Oct. 22.
- Advantages of Steam Turbines for Textile Mills. Austin R. Dodge. (Paper read before the New England Cotton Mfrs. Assoc.) (13) Oct. 22.
- Diagrams for Estimating Hydraulic Machinery. Frank B. Kleinhaus. (13) Oct. 22.
- The Miller System of Mechanical Refrigeration.\* (15) Oct. 23.
- Kilroy's Stoking Indicator.\* (26) Oct. 23.
- A New Continuous Process for Making Ingot Moulds.\* (11) Oct. 23.
- The Newcomen Engine.\* Henry Davey. (Paper read before the Inst. of Mech. Engrs.) (11) Serial beginning Oct. 23; (12) Serial beginning Oct. 23; (22) Oct. 23.
- The Reversibility of Thermodynamics. J. Swinburne. (Abstract of Paper read at the British Assoc. for the Advancement of Science.) (47) Oct. 24.
- A New Geared Speed Changing Device.\* (20) Oct. 25.

\*Illustrated.





**Mechanical (Continued).**

- Rapid-Cutting Tool Steels. (11) Serial beginning Oct. 30; (12) Oct. 30.  
 Observations Upon the Sub-Aqueous Storage of Steam Coal. J. Macaulay. (12) Oct. 30.  
 Reverse Curves Rolling Mill.\* (12) Oct. 30.  
 Steam Turbo-Electric Generating Plants. George Wilkinson. (Paper read before the Inst. of Elec. Engins.) (47) Serial beginning Oct. 31; Abstract (26) Oct. 30.  
 Modern Cylindrical Grinding.\* C. H. Norton. (Abstract of Paper read before the Cincinnati Metal Trade Assoc.) (47) Oct. 31.  
 Motors in an Elevator Factory and Machine Shop.\* (27) Oct. 31.  
 The Foundry and Town of Trafford City, Pa.\* (14) Oct. 31.  
 Works of the Marine Engine & Machine Company.\* (14) Oct. 31.  
 The Central Heating Plants of Indianapolis. W. K. Eldridge. (Paper read before the Amer. Soc. of Mun. Impvts. (60) Nov.; Abstract (13) Nov. 5.  
 Motor-Driven Machine Tools.\* (25) Nov.  
 Natural Gas in Steam Production.\* W. R. Crane. (45) Nov.  
 A New Type of Air Compressor.\* W. H. Booth. (45) Nov.  
 Electric Steam and Hydraulic Shears at German Steel Works.\* Frank C. Perkins. (41) Nov.  
 Recent Developments in the Production of Water Gas.\* A. Humboldt Sexton. (9) Nov.  
 Special Features in the Design of Locomotive Boilers and Fireboxes.\* Chas. S. Lake. (9) Nov.  
 Superheated Steam for Steam Engines; With Special Reference to the McPhail & Simpson's System.\* John Goodman, M. Inst. C. E. (10) Nov.  
 Fuel Losses in Steam Plants, and How to Determine Them. George H. Barrus. (10) Nov.  
 Oil-Fired Furnaces.\* A. M. Bell, M. Inst. M. E. (10) Nov.  
 Notes on the Operation of Large Carburetted Water Gas Sets. W. Cullen Morris. (Paper read before the Amer. Gas Light Assoc.) (24) Nov. 2.  
 The American Tube & Stamping Company's Steel Plant at Bridgeport, Conn.\* (20) Nov. 5.  
 Rapid Reduction in the Lathe as Compared with Forgings.\* Frank B. Kleinhans. (13) Nov. 5.  
 The Plant of the Buckhorn Portland Cement Co.\* Richard L. Humphrey. (13) Nov. 5.  
 The New Sturtevant Foundry and Some Details of Its Inter-Transportation System.\* (13) Nov. 5; (14) Nov. 7; (20) Oct. 29.  
 The Steam Turbine Installation of the B. F. Goodrich Company.\* (14) Nov. 7.  
 The Electrical Drive for Machine Tools. Robert Lozier. (27) Nov. 7.  
 Factory Turbo-Generator and Electric Power Distributing Plant.\* (27) Nov. 7.  
 The Policy of Gas Enrichment (Illustrated by London Practice). Arthur Graham Glasgow. (Paper read before the Amer. Gas Light Assoc.) (24) Nov. 9; (66) Oct. 27.  
 Les Machines à Vapeur Surchauffée. Alfred Vanderstegen. (31) Vol. II, Part I.  
 Théorie Élémentaire des Turbines à Vapeur. A. Rateau. (37) Sept.  
 Mode de Transport et de Distribution de Force pour la Commande des Grues de Port. Aperçu Comparatif. B. Lambert and Eug. François. (37) Sept.  
 Recherches sur la Transmission de la Chaleur dans les Appareils d'Evaporation à Multiple Effet.\* M. Sekutowicz. (32) Sept.  
 Nouveau Gazogène à Flamme Renversée.\* Jules Deschamps. (32) Sept.  
 Appareil Électrique pour le Chargement des Cornues à Gaz: Systeme P. Sarrazin. (34) Oct.  
 Appareil d'Éclairage à Alcool Dénaturé.\* Edmond Brunet. (36) Oct. 10.  
 Étude du Dérapage des Automobiles. J. Résal. (33) Serial beginning Oct. 17.  
 La Manufacture de Draps de Villeneuve (Hérault).\* Francis Marre. (33) Oct. 31.

**Metallurgical.**

- History of the Furnace. Woodbridge H. Birchmore. (69) Serial beginning Oct.  
 Borsig's Works.\* (11) Serial beginning Oct. 9.  
 The Effect of Flue Dust upon the Thermal Efficiency of Hot Blast Stoves.\* B. H. Thwaite. (62) Oct. 15.  
 Kennedy Blast-Furnace Top.\* Axel Sahlin. (62) Oct. 15.  
 Improvements in the Cyanide Assay for Copper. Thora Smith. (16) Oct. 17.  
 A Continuous Filter Press.\* (16) Oct. 17.  
 The Magnetic Concentration of Iron Ore in New Jersey.\* (20) Oct. 22.  
 The Morse Apparatus for Gauging Temperatures of Heated Substances. (20) Oct. 22.  
 Slimes Treatment on the Rand.\* H. S. Denny. (16) Oct. 24.  
 The Colorimetric Estimation of Gold in Cyanide Solutions. Henry R. Cassel. (16) Oct. 31.  
 The Foundry and Town of Trafford City, Pa.\* (14) Oct. 31.  
 Electrolytic Copper Refining. Wilder D. Bancroft. (Paper read before the Amer. Electrochemical Soc.) (45) Nov.  
 The American Tube & Stamping Company's Steel Plant at Bridgeport, Conn.\* (20) Nov. 5.  
 Treatment of Finely Divided Iron Ore. Léonce Fabre. (Tr. from the French.) (19) Nov. 7.

\*Illustrated.



**Metallurgical Continued.**

- An Examination of Various Methods for the Estimation of Ferrocyanides. J. E. Clemmell. (16) Nov. 7.  
 Les Progrès de la Métallurgie. Celle du Fer Exceptée, en 1901 et 1902.\* (34) Serial beginning Oct.  
 Installations Électrique des Hauts Fourneaux de la Société *Elba*.\* (33) Oct. 21.  
 Les Hauts Fourneaux Schneider et Cie. de Cotte.\* Francis Marre. (36) Oct. 25.  
 Les Procédés Aluminothermiques.\* Émile Dieudonné. (36) Oct. 25.

**Military.**

- The Manufacture and Efficiency of Armour-piercing Projectiles.\* David Carnegie. Assoc. M. Inst. C. E. (63) Vol. 153.  
 The Webley-Fosbery Automatic Revolver.\* Frederick S. Foltz. (44) Nov.-Dec.

**Mining.**

- Notes on Gold Dredging. Gilbert Winslow. Assoc. M. Inst. C. E. (63) Vol. 153.  
 Notes on Clapwell Colliery. Maurice Deacon, M. Inst. C. E. (Paper read before the Inst. of Min. Engrs.) (57) Oct. 9.  
 Prospecting Gold Dredge with Steel Hull.\* (68) Oct. 10; (16) Nov. 7.  
 Electric Pumping Plant at Dortmund.\* (26) Oct. 16.  
 Coal Mining in the Indian Territory. The Southwestern Field.\* W. R. Crane. (16) Oct. 17.  
 A Portable Tank for Watering the Roadways in Mines. W. Galloway. (57) Oct. 23.  
 Hydraulic Mining on the Quesnelle. Wm. M. Brewer. (16) Oct. 31.  
 Diamond Drilling in West Africa.\* J. N. Justice. (Paper read before the Inst. of Min. and Metall.) (45) Nov.  
 The Mechanical Equipment of the Kimberley Diamond Mines. Chas. V. Allen. (9) Nov.  
 Ore Quarrying in the Boundary District of British Columbia.\* E. Jacobs. (9) Nov.

**Miscellaneous.**

- The Folly of Reckoning by Gallons, Which Differ Widely in Canada and the United States, while All Countries Have Identical Liters and Cubic Meters. Frederick Brooks. (28) Sept.  
 Technical Education—What It Should be. Louis Duncan. (9) Nov.

**Municipal.**

- Some Observations on Street Pavements. S. Whinery, M. Am. Soc. C. E. (13) Serial beginning Oct. 22.  
 Difficult Street Intersections.\* (14) Oct. 24.  
 Reverse Beach Reservation of the Metropolitan Park System, Boston. H. J. Kellaway. (14) Oct. 24.  
 Report of Committee on Park Improvements and Maintenance. G. A. Parker. (Report of Committee of Amer. Soc. of Mun. Impvts.) (60) Nov.  
 Pavements of Indianapolis.\* J. B. Nelson. (Paper read before the Amer. Soc. of Mun. Impvts.) (60) Nov.  
 Medina Sandstone Pavements in Brooklyn, N. Y. C. D. Pollock. (Paper read before the Amer. Soc. of Mun. Impvts.) (60) Nov.  
 Pavements of Newark, N. J. E. Adam. Paper read before the Amer. Soc. of Mun. Impvts.) (60) Nov.  
 The Construction of Warren's Bitulithic Pavement. C. A. Kenyon. (Paper read before the Amer. Soc. of Mun. Impvts.) (60) Nov.  
 Wood Paving Specifications in Greater New York. F. A. Kummer. (Paper read before the Amer. Soc. of Mun. Impvts.) (60) Nov.  
 The Development of the Kreodone Block Pavement. P. C. Reilly. (Paper read before the Amer. Soc. of Mun. Impvts.) (60) Nov.  
 The Cost of Brick Pavements. Fred Giddings. (Paper read before the Amer. Soc. of Mun. Impvts.) (60) Nov.  
 The Passing of the Cobblestone. Geo. W. Tillson. (Paper read before the Amer. Soc. of Mun. Impvts.) (60) Nov.  
 Asphalt Pavements and Their Maintenance in Rochester, N. Y. W. J. Stewart. (Paper read before the Amer. Soc. of Mun. Impvts.) (60) Nov.

**Railroad.**

- Mountain Railways.\* George Deuchars, M. Inst. C. E. (53) Vol. 153.  
 The Construction of the Mountain Section of the Cairns Railway, Queensland. George Alexander Hobler, Assoc. M. Inst. C. E. (63) Vol. 153.  
 Permissible Wheel Load per Foot of Wheel Diameter, and per Inch of Breadth of Rail Head. Francis Joseph Edward Spring, M. Inst. C. E. (63) Vol. 153.  
 The Storage Battery in Substations on Interurban Roads.\* W. E. Goldsborough and P. E. Fansler. (42) Aug.  
 Some Notes on the Operation of Railway Motors in Service. Clarence Renshaw. (42) Aug.  
 Storage Battery Industrial Locomotives.\* F. L. Sessions. (42) Aug.  
 Predetermination in Railway Work. F. W. Carter. (42) Aug.  
 Interurban Car Tests.\* W. E. Goldsborough and P. E. Fansler. (42) Aug.

\*Illustrated.



**Railroad (Continued).**

- Effect of Cylinder Clearance upon the Quantity of Steam Consumed in doing Specific Work, with Special Reference to Locomotive Practice.\* Ira C. Hubbell. (65) Sept. 18.
- The Proprieties of Modern Locomotives. Lawford H. Fry. (65) Sept. 18.
- Railway Maintenance of Way. H. J. Shifer. (4) Oct.
- Railroading Re-naissance.\* Willard Beahm. (4) Oct.
- Steel Frame Side-Door Suburban Cars of the Illinois Central R. R.\* (30) Oct.
- Consolidation Locomotives of the Northern Pacific Railway.\* (30) Oct.
- Electric Locomotive, Baltimore & Ohio Railroad.\* (30) Oct.
- Four-Wheel Caboose, Chicago, Burlington & Quincy Railway.\* (30) Oct.
- Timber Treating Plants (for ties)\* W. W. Curtis. (4) Oct.
- The Tie Problem; with Special Reference to Concrete Ties.\* G. H. Kimball, M. Am. Soc. C. E. (4) Oct.
- Reduction in Locomotive Fuel Consumption.\* (Report of Committee of the Amer. Ry. Master Mechanics' Assoc.) (12) Oct. 9.
- Recent Improvements in the Oregon Short Line R. R.\* W. P. Hardesty. (13) Oct. 15.
- The Brilliant Cut-Off of the Pennsylvania Railroad at Pittsburg.\* (40) Oct. 16.
- Pittsburg & Lake Erie Atlantic Locomotive.\* (40) Oct. 16.
- Steel Coal Cars for the Burlington.\* (40) Oct. 16 and Oct. 23; (18) Oct. 17 and Oct. 24.
- The New York Terminal of the Pennsylvania R. R.\* (15) Oct. 16.
- Brunel and the 7-Ft. Gauge.\* Herbert T. Walker. (15) Oct. 16.
- Steam and Electric Railway Crossings. Charles R. Barnes. (Paper read before the St. Ry. Assoc. of the State of N. Y.) (17) Oct. 17.
- Power Transmission for Interurban Lines. J. B. Storer. (Paper read before the St. Ry. Assoc. of the State of N. Y.) (17) Oct. 17.
- New German Single-Phase Railway System.\* (17) Oct. 17.
- Locomotive Boiler with Water-Tube Firebox.\* (47) Oct. 17.
- Tunnels for the New York City Terminus of the Pennsylvania and Long Island Railroads.\* (14) Oct. 17; (13) Oct. 15.
- General Track Work. A. Morrison. (Abstract of Paper read before the Roadmasters' and Maintenance of Way Assoc.) (18) Oct. 17.
- Track Tools—Their Use and Abuse. J. C. Rockhold. (Abstract of Paper read before the Roadmasters' and Maintenance of Way Assoc.) (18) Oct. 17.
- The New Canadian Transcontinental Railway.\* (13) Oct. 22.
- Track Notes on the Illinois Central. (40) Oct. 23.
- Tandem Compound Express Locomotive. Russian Empire Railways.\* (12) Oct. 23.
- Class D<sup>2</sup> Mogul (2-6-0) Locomotive for the "Soo Line."\* (15) Oct. 23.
- Interurban Freight and Express.\* (17) Oct. 24.
- Roadbed Construction for World's Fair Intramural Railway.\* (17) Oct. 24.
- Construction of the Railroad Across Salt Lake.\* (46) Oct. 24.
- General Instructions to Locating Engineers; Issued by Wm. Ashton, Resident Engineer, Oregon Short Line R. R. (14) Serial beginning Oct. 24.
- Improvement of Railway Terminal Facilities at St. Louis, Mo. (13) Oct. 29.
- The Knox Steel Railroad Tie.\* (20) Oct. 29.
- The Proper Scope of Railway Standards and the Requirements Which They Should Fulfill. V. K. Hendricks. (40) Oct. 30.
- Ten-Wheel Locomotive for the "Frisco."\* (40) Oct. 30.
- Experiments with Stacks and Exhaust Pipes.\* T. H. Symington. (Extracts from a paper presented before the Richmond R. R. Club.) (15) Oct. 30.
- London and Brighton Railway Wining.\* (11) Serial beginning Oct. 30.
- Four-Cylinder Compound Locomotives. Alfred G. DeGlehn. (12) Oct. 30.
- The Pennsylvania Railroad Tunnel under New York City.\* (40) Oct. 30.
- Improved Alloys for Car Bearings. (40) Oct. 30.
- San Mateo Extension of the United Railroads of San Francisco.\* (17) Oct. 31.
- Twelve Hundred 1-Volt Direct-Current Railway in France.\* (17) Oct. 31.
- The New Union Railroad Station at Washington, D. C.\* (14) Oct. 31.
- Strength of Locomotive Steam Chests.\* O. W. Bodler. (30) Nov.
- Composite Gondola Cars of the Chicago, Burlington & Quincy Ry.\* (30) Nov.
- Mogul Locomotives for Japan, Kiushiu Railway.\* (30) Nov.
- Santa Fe Freight Locomotives, A. T. & S. F. Ry.\* (30) Nov.
- Special Features in the Design of Locomotive Boilers and Fireboxes.\* Chas. S. Lake. (9) Nov.
- New Locomotive and Car Shops. McKees Rocks, Pa., Pittsburgh & Lake Erie Railroad.\* (25) Serial beginning Nov.
- The Heaviest Locomotive Ever Built: Atchison, Topeka & Santa Fé Railway.\* (25) Nov.
- Locomotive Building in Germany.\* A. von Borries. (10) Nov.
- An Extensive Water Softening Installation, Pittsburgh & Lake Erie Railroad. (25) Serial beginning Nov.
- Heavy Freight Locomotive, Lake Shore & Michigan Southern Railway; 2-8-0 Type.\* (25) Nov.
- New Passenger Locomotives, Pittsburgh & Lake Erie Railroad, 4-4-2 Type.\* (25) Nov.
- New Freight House for the Baltimore & Ohio.\* (40) Nov. 6.
- The Farlow Draft Gear.\* (15) Nov. 6.
- Three-Position Signals vs. Separate Home and Distant. (Report of Committee of Ry. Signaling Club.) (15) Nov. 6; (18) Nov. 7; (40) Nov. 6.

\*Illustrated.





**Railroad (Continued).**

- Progress of Power Signaling in England. Charles H. Grinling. (15) Nov. 6.  
 Foundation Brake Gear for High Pressure Control.\* (Report of Committee of Ry. Signaling Club.) (15) Nov. 6.  
 The Conestoga Traction System.\* (17) Nov. 7.  
 B. & O. N. R. Engine Terminal Improvements at Pittsburg. (18) Nov. 7.  
 Notes on Railway Location in Forest Country. Moses Burpee, M. Am. Soc. C. E. (14) Nov. 7.  
 Systeme Nouveau dit des Leviers d'Itinéraires pour la Commande à Distance des Aiguilles et Signaux de Chemins de Fer (Système Bleyne et Ducousso).\* G. Bleyne. (38) Oct.  
 Le Chemin de Fer du Vésuve. (38) Oct.

**Railroad, Street.**

- High-Speed Electric Railway Problems. A. H. Armstrong. (42) Aug.  
 Some Recommendations Concerning Electrical and Mechanical Specifications of Trolley Insulators.\* Samuel Sheldon and John D. Keiley. (42) Aug.  
 Track Construction and Maintenance. Thomas William Wilson. (Paper read before the St. Ry. Assoc. of the State of N. Y.) (17) Oct. 17.  
 Power Transmission for Interurban Lines. J. B. Storer. (Paper read before the St. Ry. Assoc. of the State of N. Y.) (17) Oct. 17.  
 Steam and Electric Railway Crossings. Charles R. Barnes. (Paper read before the St. Ry. Assoc. of the State of N. Y.) (17) Oct. 17.  
 Mekarski System of Compressed-Air Locomotives as Used on Suburban Lines in Paris.\* (10) Oct. 17.  
 A Combined Street Railway and Lighting Plant at Muskegon, Mich.\* (14) Oct. 17.  
 A New Method of Tunneling under Broadway, New York.\* (14) Oct. 21.  
 Harlem River Tunnel of the Rapid Transit Subway.\* (46) Oct. 31.  
 The Brooklyn Tunnel of the New York Rapid Transit Railroad. (14) Oct. 31.  
 New Sub-Station on the Portsmouth, Kittery & York Street Railway.\* (17) Nov. 7.  
 Novel Convertible Car.\* (17) Nov. 7.  
 The Construction of the East Boston Tunnel of the Boston Subway System.\* Robert B. Farwell. (14) Serial beginning Nov. 7.  
 Un Métropolitain à Voies Glissantes.\* G. Sautereau. (36) Oct. 10.

**Sanitary.**

- A Sewage Disposal System for a Country Residence.\* (70) Sept.  
 Plumbing in the Rapid Transit Railroad Stations, New York.\* (70) Oct.  
 Regulations for Plumbing and Sewer Connections at the St. Louis Exposition. (70) Oct.  
 The Design of Works for the Bacterial Treatment of Sewage. Stuart H. Davies. (11) Oct. 9.  
 Rock Trench-Work, Boston, Mass. Frederick I. Winslow. (13) Oct. 22.  
 A British View of the Bacterial Treatment of Sewage. Samuel Rideal. (Abstract of Paper read before the International Congress of Hygiene.) (13) Oct. 22.  
 Sewage Disposal at Hebden Bridge.\* (12) Oct. 23.  
 The Disposal of New York's Refuse.\* (46) Oct. 24.  
 Baltimore's System of Garbage Disposal.\* (46) Oct. 31.  
 Perviousness of Sewers. A. P. Folwell. (Paper read before the Amer. Soc. of Mun. Impvts.) (60) Nov.; (14) Nov. 7.

**Structural.**

- Timber Treating Plants.\* W. W. Curtis. (4) Oct.  
 The Relative Strength of Wet and Dry Concrete. James W. Sussex. (From *The Technograph*.) (67) Oct.  
 Effect of Clay on the Strength of Concrete. J. J. Richey and B. H. Prater. (67) Oct.  
 Sound and Unsound Portland Cements. (67) Oct.  
 Borsig's Works.\* (11) Serial beginning Oct. 9.  
 Effect of Wind on Roofs. Theodor Nielsen, M. Danish I. C. E. (11) Oct. 9.  
 Fireproof Construction; Does it Afford Added Fire Protection? Perez M. Stewart. (13) Oct. 15.  
 Concrete Reinforcement.\* Julius Kahn, Assoc. M. Am. Soc. C. E. (40) Oct. 16; (14) Oct. 17; (13) Oct. 15; (15) Oct. 16.  
 Certain Vexatious and Fallacious Cement Tests now in Vogue. D. B. Butler. (Paper read before the Soc. of Engrs.) (12) Oct. 16.  
 Interlocking Metal Piling for Power House Foundations.\* (14) Oct. 24.  
 Notes on the Microstructure of Steel. James E. Howard. (20) Oct. 29.  
 Testing Brittleness of Steel.\* E. Z. Izod. (Paper read before the British Assoc. for the Advancement of Science.) (62) Oct. 29.  
 Fractures and Characteristics of Iron and Steel.\* R. G. Griswold. (64) Nov.  
 The Microscope in Engineering; Its Widening Use in Studying the Structure of Metals.\* J. L. Hall. (10) Nov.  
 The Plant of the Buckhorn Portland Cement Co.\* Richard L. Humphrey. (13) Nov. 5.  
 A New Type of Reinforced Hollow File Wall Construction. (13) Nov. 5.  
 The Fabst Hotel and Majestic Theater.\* (14) Nov. 7.

\*Illustrated.



**Structural—(Continued).**

Bronzes et Laitons Entrant dans la Confection de Diverses Pièces de Machines et de Robinetterie.\* Ern. Roussel. (31) Vol. II, Part I.  
 La Prévention des Accidents dans les Travaux du Bâtiment.\* Paul Razoux. (33) Oct. 3.

**Topographical.**

Topographical Surveying.\* W. C. Bunnell. (4) Oct.  
 Recent Rapid Base-Line Measures, Precise Leveling, and Triangulation.\* A. L. Baldwin. (2) Oct.  
 The Determination of the Longitude of Honolulu, 1555-1903. John F. Hayford, Assoc. M. Am. Soc. C. E. (13) Nov. 5.

**Water Supply.**

Recent Irrigation in the Punjab.\* Sidney Preston, Assoc. M. Inst. C. E. (63) Vol. 153.  
 The Flow of Water in Long Pipes. George Maxwell Lawford, M. Inst. C. E. (63) Vol. 153.  
 The Irrigation-Weir across the Bhadar River, Kathiawar. John James Bourne Benson, Assoc. M. Inst. C. E. (63) Vol. 153.  
 Work done in the Orange River Colony Refugee Camps. Henry C. Trollope. (63) Vol. 153.  
 Water Works Statistics for the Year 1902, in Form Adopted by the New England Water Works Association; compiled by Charles W. Sherman. (28) Sept.  
 The Significance of Bacteriological Methods in Sanitary Water Analysis. C.-E. A. Winslow and C. P. Nibecker. (7) Sept.  
 History and Description of the Montreal Water Works.\* George Janin. (28) Sept.  
 Service Boxes of the Montreal Water Works.\* T. W. Lesage. (28) Sept.  
 The Lawrence Filter.\* M. F. Collins. (28) Sept.  
 Conservation and Increase of Subterranean Water.\* E. O. Mawson. (12) Oct. 9.  
 The Methods and Cost of Installing Meters at Cleveland, O. (13) Oct. 22.  
 Transmission of Hudson River Power.\* (27) Serial beginning Oct. 24.  
 The Cheesman Dam and Other Works for the Water Supply of Denver, Colorado.\* (14) Oct. 24.  
 The Indianapolis Water Company. F. A. W. Davis. (Paper read before the Amer. Soc. of Mun. Impvts.) (60) Nov.  
 The Construction of the Sixty-Inch Reinforced Conduits of Newark, N. J.\* Morris R. Sherrerd. (Paper read before the Amer. Soc. of Mun. Impvts.) (60) Nov.  
 Some Sources of Error in Water Treatment. H. Spencer Flynt. (9) Nov.  
 An Extensive Water-Softening Installation, Pittsburgh & Lake Erie Railroad. (25) Serial beginning Nov.  
 A Hollow Concrete-Steel Dam at Theresa, N. Y.\* Ambursen & Sayles. (13) Nov. 5.  
 An English Water-Softening Plant. (14) Nov. 7.  
 A Small open Sand Filter at Reading, Pa.\* (14) Nov. 7.  
 Les Barrages d'Assyout et d'Assouan et le Système Général des Irrigations de l'Égypte.\* G. Richou. (33) Serial beginning Oct. 10.

**Waterways.**

Measurements of the Underflow at the Narrows of the Rio Hondo and San Gabriel, California.\* Charles S. Slichter. (14) Oct. 17.  
 Holding Power of Ballast in Timber Cribs. (14) Nov. 7.  
 Electrical Equipment of the Miami-Erie Canal.\* Charles W. Ricker. (17) Nov. 7.  
 Construction par l'Air Comprimé de Nouvelles Cales Lèches, au Port de Kiel.\* (33) Oct. 24.

\*Illustrated.





## AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1852.

## PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

## SOCIETY AFFAIRS.

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## MINUTES OF MEETINGS.

## OF THE SOCIETY.

**December 2d, 1903.** The meeting was called to order at 8.10 p. m., President Noble in the chair; Chas. Warren Hunt, Secretary; and present, also, 93 members and 11 guests.

The minutes of the meetings of November 4th and 18th, 1903, were approved as printed in *Proceedings* for November, 1903.

A paper by S. Maximoff, Assoc. M. Am. Soc. C. E., entitled "A Desirable Method of Dredging Channels through River Bars," was presented by the Secretary, who also read a communication on the subject from Rudolph Hering, M. Am. Soc. C. E.

The paper was discussed verbally by Messrs. E. L. Corthell, A. W. Robinson, H. J. Howe, Edward P. North and D. E. Moran.

Ballots for membership were canvassed, and the following candidates elected:

AS MEMBERS.

THOMAS WALKER FOWLER, Melbourne, Victoria, Australia.  
HUBERT EDWARD GREEN, San Francisco, Cal.  
WILLIAM STORRS MACHARG, Chicago, Ill.  
JOHN MCNEAL, Jr., Easton, Pa.  
FLORIAN GAIE ROSS, Pittsburg, Pa.  
REGINALD HEBER THOMSON, Seattle, Wash.  
CHARLES BEATTY WILSON, Tullahoma, Tenn.  
ANDREW FEASTER WOOLLEY, Mexico, Mexico.

AS ASSOCIATE MEMBERS.

JOSEPH HOCKMAN BOWMAN, Tonalá, Chiapas, Mexico.  
EDWARD SYLVESTER BROWER, Brooklyn, N. Y.  
ARTHUR IRA CAMPBELL, Osceola, Ark.  
WILLIAM ELIOT HAMLIN, New York City.  
CHARLES WARREN MURRAY, Americus, Ga.  
JULIUS WELCH PFAU, South Schenectady, N. Y.  
EDGAR MAVERICK SMITH, Chicago, Ill.  
SUTTON VAN PELT, Tidewater, Ala.  
SAMUEL DAUGHERTY WILLIAMS, Jr., Toledo, Ohio.  
JAMES ALBERT WOODRUFF, West Point, N. Y.  
HENRY AMERMAN YOUNG, Fort Washington, Md.

The Secretary announced the transfer of the following candidates, by the Board of Direction, on December 1st, 1903, from the grade of Associate Member to the grade of Member:

AS MEMBERS.

FREDERICK ALBERT COLEMAN, Belington, W. Va.  
JOHN LYLE HARRINGTON, West New Brighton, N. Y.  
KINGSLEY LEVERICH MARTIN, Brooklyn, N. Y.  
CHARLES WILLIAM SMITH, New York City.  
BERNARD MATTHEW WAGNER, Brooklyn, N. Y.  
IRVING MASON WOLVERTON, Mt. Vernon, Ohio.

The Secretary announced the election of the following candidates by the Board of Direction, on December 1st, 1903:

## AS JUNIORS.

SYLVANUS A BECKER, Connellsville, Pa.

JOHN HARRISON FOSS, Huelo, Maui, Hawaii.

JOHN BLAKE GORDON, Washington, D. C.

GUY SCOTT, Columbus, Ohio.

CHARLES WOOD SUTTON, Union, Ore.

HOWARD SHAY WILLIAMS, Boonton, N. J.

HENRY WRIGHT WOODCOCK, Brooklyn, N. Y.

TUCK CHING STRONG YEN, Shanghai, China.

Adjourned.

**December 16th, 1903.**—The meeting was called to order at 8.45 P. M., President Noble in the chair; Chas. Warren Hunt, Secretary; and present, also, 107 members and 9 guests.

A paper, by Emile Low, M. Am. Soc. C. E., entitled "The Breakwater at Buffalo, New York," was presented by the Secretary, who also read communications on the subject from Messrs. G. H. Raymond, Thomas D. Pitts, William T. Lyle and George E. Fell.

Adjourned.

## OF THE BOARD OF DIRECTION.

(Abstract.)

**December 1st, 1903.**—President Noble in the Chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Briggs, Buck, Craven, Croes, Davison, Osgood, Pegram, and Schneider.

The Secretary reported that the Committee appointed, on the recommendation of this Society, by the authorities of the St. Louis Exposition, 1904, to organize an International Congress of Engineering, had made every effort to secure the co-operation of the American Society of Mechanical Engineers, the American Institute of Mining Engineers, the American Institute of Electrical Engineers, the Society of Naval Architects and Marine Engineers, and the Society for the Promotion of Engineering Education, and of those Bureaus of the Department of War, and the Department of Commerce and Labor, in charge of Military Engineering; but as the American Society of Mechanical Engineers, and the American Institute of Electrical Engineers declined to co-operate in the project, the Committee had decided to report its inability to organize the proposed Congress, and had so reported to the authorities of the Exposition.

The Committee on Publications, and the Secretary, were appointed as a Committee to prepare for the Convention of the Society on an International Basis.

Applications were considered and other routine business transacted.

Six candidates were transferred from the grade of Associate Member to that of Member, and eight candidates for admission were elected to the grade of Junior.\*

Adjourned.

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\* See pages 438 and 439.

## ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

### MEETINGS.

**Wednesday, January 6, 1904.**—8.30 p. m.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper, entitled "Theory of the Spherical Dome with a Homogeneous Surface, and of the Framed Dome; Also Notes on the Construction of Masonry and Metal Domes," by E. Schmitt, Assoc. M. Am. Soc. C. E., will be presented for discussion.

This paper is printed in this number of *Proceedings*.

### ANNUAL MEETING.

The Fifty-first Annual Meeting will be held at the Society House, January 20th and 21st, 1904. The Business Meeting will be called to order at 10 o'clock on Wednesday morning. The annual reports will be read, officers for the ensuing year elected, and members of the Nominating Committee appointed. The proposed project for a Union Engineering Building, and the proposition to appoint a Special Committee on "Concrete and Steel-Concrete," will also be part of the order of business.

Arrangements for the excursions and entertainments have been placed in the hands of the following committee:

J. WALDO SMITH,  
S. L. F. DEYO, CHAS. WARREN HUNT.

### NOMINATING COMMITTEE.

The Constitution provides that at the Annual Meeting of each year, seven Corporate Members, not officers of the Society, one from each of the seven geographical districts, into which the Society is divided for this purpose, shall be appointed by the meeting to serve for two years.

The usual blank request for suggestions as to representatives of each district, for presentation to the meeting, has been mailed to Corporate Members.

### ANNUAL CONVENTION, 1904.

The Thirty-sixth Annual Convention will be held at St. Louis, Mo., during the week beginning October 3d, 1904.

A Committee of the Board of Direction is now arranging a programme, with a view to making this Convention an International Meet-



ing of Engineers, for the presentation and discussion of timely subjects of professional interest.

As the details of the arrangements are developed, they will be announced in *Proceedings*.

### UNIVERSAL EXPOSITION, ST. LOUIS, 1904.

The Society has undertaken to provide for an Engineering Exhibit, and the establishment of Headquarters for visiting engineers, and the Board of Direction has appropriated sufficient funds to defray the necessary expense.

This matter is in the hands of the following Committee:

ROBERT MOORE, M. Am. Soc. C. E., St. Louis, Mo., *Chairman*.

EDWARD C. CARTER, M. Am. Soc. C. E., Chicago, Ill.

MORDECAI T. ENDICOTT, M. Am. Soc. C. E., Washington, D. C.

JAMES L. FRAZIER, " " Frankfort, Ind.

WILLIAM JACKSON, " " Boston, Mass.

EMIL KUICHLING, " " New York, N. Y.

JOHN F. WALLACE, " " Chicago, Ill.

H. J. PFEIFER, Assoc. M. Am. Soc. C. E., St. Louis, Mo., *Secretary*.

### SEARCHES IN THE LIBRARY.

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many such searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction, to the members who have made use of the resources of the Society in this manner, has been expressed frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling, compared with the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

Copies of all lists of references are filed, so that in many cases it is only necessary to make a typewritten copy, which reduces the cost of searches to a minimum.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

## ACCESSIONS TO THE LIBRARY.

From November 11th to December 8th, 1903.

## DONATIONS.\*

## MODERN LOCOMOTIVE PRACTICE.

A Treatise on the Design, Construction, and Working of Steam Locomotives. By C. E. Wolff, A. M. Inst. C. E. Cloth,  $9 \times 6$  ins.,  $8 + 267 + 5$  pp., illus. Manchester, The Scientific Publishing Company. 10 shillings, 6 pence, net.

In this book the first chapter contains a short discussion of the resistances to be overcome by the locomotive, and the chapters which follow are arranged in what appears to the author to be the natural order. Two chapters are devoted to the discussion of the different general types in use in Great Britain, and then follow ten chapters dealing with the different parts in detail. The design of link motions and of radial valve gears has been treated at considerable length, and a new method of working out accurately a link motion described. A similar method is adopted for the working out of Joy's valve gear, and a calculation given of the maximum value of the stresses in the connecting rod due to the inertia of this gear. All the drawings have been reproduced from actual working drawings. The Contents are: Introduction—Train Resistance; Types of Express Locomotives; Goods and Mineral Engines; The Locomotive as a Carriage; Boilers; Cylinders; Valve Motions; Radial and Single Eccentric Valve Gears; Connecting Rods; Crossheads and Slides; Crank Axles; Balancing; Wheels; Examples of Modern Locomotives; Slipping of Locomotives at High Speeds. There is an index of five pages.

## IRRIGATION ENGINEERING.

By Herbert M. Wilson, M. Am. Soc. C. E. Fourth Edition. Revised and Enlarged. Cloth,  $9 \times 6$  ins.,  $23 + 573$  pp., illus. N. Y., John Wiley & Sons, 1903. \$4.00.

The author states in the preface that since the issue of the second edition there have been few important developments in hydraulic engineering, consequently the present revision does not affect any portion of the book radically, though it has been sufficiently thorough to affect every portion more or less. There have been constructed recently a number of great storage dams, both of masonry and of loose rock, and important changes in existing structures have been made. These are noted in Part III, in which the greatest amount of textual change has been made. The chapter on sub-surface water sources has been improved materially. The chapter on rainfall and run-off of streams has been brought up to date and extended. The Contents are: Precipitation, Runoff, and Stream Flow; Evaporation, Absorption, and Seepage; Alkali, Drainage, and Sedimentation; Quantity of Water Required; Flow and Measurement of Water in Open Channels; Sub-surface Water Sources and Sewage for Irrigation; Classes of Irrigation Works, Alignment, Slope, and Cross-Section; Headworks and Diversion Weirs; Scouring Sluices, Regulators, and Escapes; Falls and Drainage Works; Distributaries; Application of Water, and Pipe Irrigation; Location and Capacity of Reservoirs; Earth and Loose-Rock Dams; Masonry Dams, Wasteways and Outlet Sluices; Pumping, Tools and Maintenance; Tables. There is an index of thirty-three pages.

## THE DESIGN OF STEEL MILL BUILDINGS AND THE CALCULATION OF STRESSES IN FRAMED STRUCTURES.

By Milo S. Ketchum, Assoc. M. Am. Soc. C. E. Cloth,  $9 \times 6$  ins.,  $13 + 367$  pp., illus. New York, The Engineering News Publishing Co., 1903. \$4.00.

This book is intended to provide a short course in the calculation of stresses in framed structures, and give a brief discussion of mill-building construction. It is to supplement the elementary books on stresses, on one hand, and the more elaborate treatises on bridge design, on the other. While the book is concerned chiefly with mill buildings, much of the matter will apply equally well to all classes of steel-frame construction. Both the algebraic and graphic methods of calculating stresses are described and illustrated. In the discussion of mill-building construction, the aim has been to describe the methods of construction and the material used, together with a brief treatment of mill-building design, and the making of estimates of weight and cost. The Contents are: Dead Loads; Snow Loads; Wind Loads; Miscellaneous Loads; Graphic Statics; Stresses in Framed Structures; Stresses in Simple Roof Trusses;

\* Unless otherwise specified, books in this list have been donated to the Library by the Publishers.

Simple Beams; Moving Loads on Beams; Stresses in Bridge Trusses; Stresses in a Transverse Bent; Stresses in Portals; Stresses in Three-Hinged Arch; Stresses in Two-Hinged Arch; Combined and Eccentric Stresses; General Design; Framework; Corrugated Steel; R. of Coverings; Side Walls and Masonry Walls; Foundations; Floors; Windows and Skylights; Ventilators; Doors; Shop Drawings and Rules; Paints and Painting; Estimate of Weight and Cost; Miscellaneous Structures. There is an index of five pages.

#### FRICTION AND LUBRICATION.

A Hand-Book for Engineers, Mechanics, Superintendents and Managers. By William M. Davis. Cloth, 8 × 6 ins., 225 pp., illus. The Lubrication Publishing Co., Pittsburg, Pa., 1903. \$2.00.

The author, for the past ten years, has been in a position to make a close study of lubrication, on many kinds of engines and machinery, under all sorts of conditions. In presenting this book to the notice of those who have to do with the use of lubricants, while he has not endeavored to exploit any new theories, he has kept in mind the fact that engineers, managers and mechanics are busy men, and, therefore, he has tried to present the matter in a plain, concise way that will be readily understood by readers and be of practical value in their every-day work. Some of the chapter headings are: Friction; Friction Losses; Theory of Lubrication; Testing of Oils; Cylinder and Valve Lubrication; Lubricating Appliances; Care of Sight Feed Lubricators; Cutting and Scoring of Cylinder Surfaces; Groaning of Pump and Engine Valves; Deposits of Sticky and Solid Substances in Steam Cylinders; Effects of Some Boiler Compounds on Cylinder Lubrication; Lubrication of Gas and Gasoline Engines; Oiling Devices; Grease; Bearings and Journals; Hot Bearings and their Treatment; Ball and Roller Bearings; Oil House Methods, Cost, etc. There is an index of nine pages.

#### Gifts have also been received from the following:

- |   |  |
|---|--|
| Am. Electrochemical Soc. 1 bound vol.                     | Lillibridge, Ray D. 1 pam.                     |
| Assoc. of Ontario Land Surv. 3 pam.                       | Master Car Builders' Assoc. 1 bound vol.       |
| Baltimore & Ohio R. R. Co. 1 pam.                         | Mayne, Charles. 10 vol.                        |
| Baltimore, Chesapeake & Atlantic Ry. Co. 3 pam.           | Mead, Elwood. 1 bound vol.                     |
| Buffalo, N. Y.—Bureau of Water. 8 vol., 2 pam.            | Metropolitan West Side Elevated Ry. Co. 2 pam. |
| Buffalo & Susquehanna R. R. Co. 2 pam.                    | Montgomery, J. A. 1 pam.                       |
| Canada—Supt. of Immigration. 1 vol.                       | Morison, R. L. 1 bound vol.                    |
| Chicago & Eastern Ill. R. R. Co. 1 pam.                   | N. J.—Custodian of Pub. Documents. 1 pam.      |
| Chicago, Indianapolis & Louisville Ry. Co. 1 pam.         | N. Y. Continental Jewell Filtration Co. 1 pam. |
| Chicago, Rock Island & Pacific Ry. Co. 1 pam.             | N. Y. Edison Co. 14 pam.                       |
| Chicago Terminal Transfer R. R. Co. 2 pam.                | Newark, N. J.—Document Clerk. 1 bound vol.     |
| Cincinnati, Hamilton & Dayton Ry. Co. 1 pam.              | Platt, T. C. 6 pam.                            |
| City Record. 1 bound vol.                                 | Poor's R. R. Manual Co. 1 bound vol.           |
| Colliery Guardian Co. Ltd. 1 pam.                         | Purdon, C. D. 1 pam.                           |
| Conn.—State Board of Health. 3 bound vol., 1 vol.         | Reading, Pa.—Water Dept. 1 bound vol.          |
| Corthell, E. L. 1 pam.                                    | Royal Philosophical Soc. of Glasgow. 1 vol.    |
| Denver, Colo.—Bureau of Health. 21 pam.                   | Rust, C. H. 1 bound vol.                       |
| Detroit & Mackinac Ry. Co. 1 pam.                         | Ruttan, H. N. 1 pam.                           |
| Fisk, W. L. 1 pam.  | St. Louis Southwestern Ry. Co. 1 pam.          |
| Glooucester, Mass.—City Clerk. 1 bound vol.               | Soc. of Naval Arch. & Marine Engrs. 1 pam.     |
| Great Britain Patent Office. 1 vol., 8 pam.               | South Australia—Rys. Commr. 1 pam.             |
| Gulf & Ship Island R. R. Co. 1 pam.                       | Southern Indiana Ry. Co. 1 pam.                |
| Harvard Univ. 2 bound vol.                                | Steece, E. A. 13 pam.                          |
| Hubbell, C. W. 1 pam.                                     | Toledo, St. Louis & Western R. R. Co. 1 pam.   |
| Ill.—Bureau of Labor Statistics. 1 bound vol.             | Union Pacific R. R. Co. 1 pam.                 |
| Ind.—Dept. of Geology & Natural Resources. 2 bound vol.   | U. S. Bureau of Labor. 1 pam.                  |
| Inst. of Engrs. & Shipbuilders. 1 bound vol.              | U. S. Bureau of Steam Eng. 1 pam.              |
| Inst. of Marine Engrs. 1 bound vol.                       | U. S. Commr. of Patents. 1 pam.                |
| Interurban Street Ry. Co. 1 pam.                          | U. S. Copyright Office. 1 pam.                 |
| Japan—Imperial Earthquake Investigation Committee. 7 pam. | U. S. Navy Dept. 10 pam.                       |
| League of Am. Municipalities. 1 vol.                      | U. S. Patent Office. 1 vol.                    |
|   | Univ. of California. 1 vol.                    |
|   | Univ. of Ill. Agri. Exper. Station. 2 pam.     |
|   | Wabash R. R. Co. 2 pam.                        |
|   | Wisconsin Central Ry. Co. 2 pam.               |
|   | Yazoo & Mississippi Valley R. R. Co. 2 pam.    |

## BY PURCHASE.

**Cours d'Électricité.** Théorique et Pratique. Par C. Sarazin. Deuxième Edition, Revue et Augmentée. Paris, E. Bernard & Cie, 1903.

**Die Telegraphie ohne Draht.** Von Augusto Righi und Bernhard Dessau. Braunschweig, Friedrich Vieweg und Sohn, 1903.

**Gas-Engine Design.** With an Introduction on Comprssed Air. By E. J. Stoddard. Parker & Burton, Detroit.

**Acetylene : The Principles of its Generation and Use.** A Practical Handbook on the Production, Purification, and Subsequent Treatment of Acetylene for the Development of Light, Heat and Power. By F. H. Leeds and W. J. Atkinson Butterfield. London, Charles Griffin and Company, 1903.

**Hydraulics with Working Tables.** By E. S. Bellasis, M. Inst. C. E. Rivingtons, London, 1903.

## SUMMARY OF ACCESSIONS.

November 11th to December 8th, 1903.

Donations (including 18 duplicates).....	178
By purchase.....	5
Total .....	183

## MEMBERSHIP.

## ADDITIONS.

MEMBERS.		Date of Membership.
ALBERTSON, CHARLES.	Sub-Agt. and Mgr., Eng. Jun.	Oct. 1, 1895
Dept., The Am. Trading Co., 99 Kita-	} Assoc. M.	Mar. 1, 1899
machi, Kobe, Japan.....		Oct. 7, 1903
BASSELL, BURR.	Kernville, Cal.....	Nov. 4, 1903
CLARK, JOHN HOWARD.	45 Lincoln St., Malden, Mass .....	Nov. 4, 1903
DIXON, CHARLES YOUNG.	U. S. Asst. Engr., Amherstburg, Ont., Canada.....	Nov. 4, 1903
DUNHAM, LEWIS AUGUSTUS.	404 New England Bldg., Kansas City, Mo.....	June 3, 1903
HARRINGTON, JOHN LYLE.	C. W. Hunt Co., West Jun.	Aug. 31, 1897
New Brighton, N. Y.....	} Assoc. M.	Oct. 4, 1899
		Dec. 1, 1903
HOLMES, HOWARD CARLETON.	Chf. Engr., San Francisco Dry Dock Co., San Fran., Oakland & San Jose R. R., Room 12, Ferry Bldg., San Francisco, Cal.....	Nov. 4, 1903
JONAH, FRANK GILBERT.	Chf. Engr., St. L., Brownsville & Mex. Ry., Corpus Christi, Tex.....	Nov. 4, 1903
MCNEAL, JOHN, Jr.	Asst. Engr., Lehigh Coal & Nav. Co., 507 Drake Bldg., Easton, Pa.....	Dec. 2, 1903
MARTIN, KINGSLEY LEVERICH.	Asst. Engr., Dept. of Bridges, New York City, 84 Broadway, Brooklyn, N. Y.....	Jun. Nov. 5, 1895
	} Assoc. M.	May 3, 1899
		Dec. 1, 1903
POLLEDO, YSIDORO.	Manzaneda 16, Matanzas, Cuba.....	Jun. Jan. 2, 1889
	} M.	Nov. 4, 1903
SMITH, CHARLES WILLIAM.	Chf. Engr., O'Rourke Eng. Constr. Co., 26 Nassau St., New York City.....	Assoc. M. Apr. 5, 1893
	M.	Dec. 1, 1903
THORNHILL, EDWARD BAYLIES.	Chf. Engr., L. & N. W. Ry., Euston Station, London, England.....	Oct. 7, 1903
UHLIG, CARL.	Asst. Engr. and Chf. Draftsman, Board of State Harbor Commrs., Room 16, Ferry Bldg., San Francisco, Cal.....	Oct. 7, 1903
WAGNER, BERNARD MATTHEW.	Asst. Engr., Dept. of Water Supply, Gas and Electricity, City of New York (Res., 257 East 12th St., Flatbush, Brooklyn), N. Y.....	Assoc. M. May 3, 1899
	M.	Dec. 1, 1903
WENDT, EDWIN FREDERICK.	Asst. Engr., Pitts. & Lake Erie R. R., Terminal Station, Pittsburg, Pa.....	Oct. 7, 1903
WILLIAMS, CHAUNCEY GRANT.	25 Clinton St., Brooklyn, N. Y.....	Assoc. M. Feb. 6, 1895
	M.	Oct. 7, 1903
WILSON, CHARLES BEATTY.	Bridge Superv., N. C. & St. L. Ry., P. O. Box 33, Tullahoma, Tenn.....	Dec. 2, 1903



	Date of Membership.
WOLVERTON, IRVING MASON. Chf. Engr., The Mt. Vernon Bridge Co., Mt. Vernon, Ohio.... } Assoc. M.	Dec. 1, 1895
WOOLLEY, ANDREW FEASTER. Calle Damas 131, Tampico, Mexico.....	Dec. 2, 1903

## ASSOCIATE MEMBERS.

BROWER, EDWARD SYLVESTER. Asst. Engr., Brooklyn Heights R. R. Co., 164 Montague St., Brooklyn, N. Y.....	Dec. 2, 1903
PRITCHETT, CHARLES MARCELLUS. Asst. Engr., U. S. Geological Survey, Washington, D. C.....	Sept. 2, 1903
SIMPSON, ERASTUS ROLAND. Engr. and Gen. Mgr., Mech. Dept., Chapman Double Ball Bearing Co., Ltd., 39 Pearl St., Toronto, Ont., Canada.....	Nov. 4, 1903
VAN PELT, SUTTON. U. S. Engr. Office, Tusca- } loosa, Ala.....	Mar. 6, 1900
	Dec. 2, 1903
WENTWORTH, CHARLES AUSTIN. Civ. Engr., U. S. N., 1437 Rhode Island Ave., Washington, D. C.....	Oct. 7, 1903
WILLIAMS, SAMUEL DAUGHERTY, Jr. Chf. Engr., The Toledo Ry. & Terminal Constr. Co., 201 Terminal Station, Toledo, Ohio.....	Dec. 2, 1903
WOODRUFF, JAMES ALBERT. 1st Lieut., Corps of Engrs., U. S. A., West Point, N. Y.....	Dec. 2, 1903
YOUNG, HENRY AMERMAN. In Chg. of Constr. Work for U. S. Engr. Dept. at Ft. Wash- } ington, Md., and at Ft. Hunt, Va. Address, } U. S. Engr. Office, Fort Washington, Md. }	Jun. Mar. 5, 1901
	Dec. 2, 1903

## ASSOCIATES.

OLLS, WILLIAM CLARENCE. Box 739, Erie, Pa.....	Nov. 3, 1903
WILCOCK, FREDERICK. 862 Fiftieth St., Brooklyn, } N. Y.....	Jun. Jan. 7, 1902
	Oct. 6, 1903

## JUNIORS.

GAY, ROBERT WALTER. 425 Avenue E, Bayonne, N. J.....	Oct. 6, 1903
GORDON, JOHN BLAKE. 6 Cooke Pl., N. W., Washington, D. C.	Dec. 1, 1903
GRISWOLD, HARRY TODD. Old Lyme, Conn.....	Oct. 6, 1903
HANCOCK, HENRY SYDNEY, Jr. 627 Cooper St., Camden, N. J.	Oct. 6, 1903
SCOTT, GUY. Union Station, Columbus, Ohio.....	Dec. 1, 1903
WEBSTER, ROYAL SYLVESTER. 3755 Washington St., Kansas City, Mo.....	Oct. 6, 1903
WILLIAMS, HOWARD SHAY. Box 522, Boonton, N. J.....	Dec. 1, 1903
WOODCOCK, HENRY WRIGHT. Asst. Insp., Brooklyn Heights R. R. Co., 2431 Church Ave., Brooklyn, N. Y.....	Dec. 1, 1903

## MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(November 11th to December 8th, 1903.)

NOTE.—This list is published for the purpose of placing before the members of the Society the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.

### LIST OF PUBLICATIONS.

In the subjoined list of articles references are given by the number prefixed to each journal in this list.

- (1) *Journal*, Assoc. Eng. Soc., 257 South Fourth St., Philadelphia, Pa., 30c.
- (2) *Penn. Engrs. Club of Phila.*, 1122 Girard St., Philadelphia, Pa.
- (3) *Journal*, Franklin Inst., Philadelphia, Pa., 50c.
- (4) *Journal*, Western Soc. of Engrs., Monadnock Block, Chicago, Ill.
- (5) *Transactions*, Can. Soc. C. E., Montreal, Que., Canada.
- (6) *School of Mines Quarterly*, Columbia Univ., New York City, 50c.
- (7) *Technology Quarterly*, Mass. Inst. Tech., Boston, Mass., 75c.
- (8) *Stevens Institute Indicator*, Stevens Inst., Hoboken, N. J., 50c.
- (9) *Engineering Magazine*, New York City, 25c.
- (10) *Cassier's Magazine*, New York City, 25c.
- (11) *Engineering* (London), W. H. Wiley, New York City, 25c.
- (12) *The Engineer* (London), International News Co., New York City, 35c.
- (13) *Engineering News*, New York City, 15c.
- (14) *The Engineering Record*, New York City, 12c.
- (15) *Railroad Gazette*, New York City, 10c.
- (16) *Engineering and Mining Journal*, New York City, 15c.
- (17) *Street Railway Journal*, New York City, 35c.
- (18) *Railway and Engineering Review*, Chicago, Ill., 10c.
- (19) *Scientific American Supplement*, New York City, 10c.
- (20) *Iron Age*, New York City, 10c.
- (21) *Railway Engineer*, London, England, 25c.
- (22) *Iron and Coal Trades Review*, London, England, 25c.
- (23) *Bulletin*, American Iron and Steel Assoc., Philadelphia, Pa.
- (24) *American Gas Light Journal*, New York City, 10c.
- (25) *American Engineer*, New York City, 25c.
- (26) *Electrical Review*, London, England.
- (27) *Electrical World and Engineer*, New York City, 10c.
- (28) *Journal*, New England Water Works Assoc., Boston, \$1.
- (29) *Journal*, Society of Arts, London, England, 15c.
- (30) *Annales des Travaux Publics de Belgique*, Brussels, Belgium.
- (31) *Annales de l'Assoc. des Ing. Sortis de l'Ecole Polytechnique de Liège*, Brussels, Belgium.
- (32) *Mémoires et Compte Rendu des Travaux*, Soc. Ing. Civ. de France, Paris, France.
- (33) *Le Génie Civil*, Paris, France.
- (34) *Portefeuille Economique des Machines*, Paris, France.
- (35) *Nouvelles Annales de la Construction*, Paris, France.
- (36) *La Revue Technique*, Paris, France.
- (37) *Revue de Mécanique*, Paris, France.
- (38) *Revue Générale des Chemins de Fer et des Tramways*, Paris, France.
- (39) *Railway Master Mechanic*, Chicago, Ill., 10c.
- (40) *Railway Age*, Chicago, Ill., 10c.
- (41) *Modern Machinery*, Chicago, Ill., 10c.
- (42) *Transactions*, Am. Inst. Elec. Engrs., New York City, 50c.
- (43) *Annales des Ponts et Chaussées*, Paris, France.
- (44) *Journal*, Military Service Institution, Governor's Island, New York Harbor, 50c.
- (45) *Mines and Minerals*, Scranton, Pa., 20c.
- (46) *Scientific American*, New York City, 8c.
- (47) *Mechanical Engineer*, Manchester, England.
- (54) *Transactions*, Am. Soc. C. E., New York City, \$5.
- (55) *Transactions*, Am. Soc. M. E., New York City, \$10.
- (56) *Transactions*, Am. Inst. Min. Engrs., New York City, \$5.
- (57) *Colliery Guardian*, London, England.
- (58) *Proceedings*, Eng. Soc. W. Pa., 410 Penn. Ave., Pittsburg, Pa., 50c.
- (59) *Transactions*, Mining Inst. of Scotland, London and Newcastle-upon-Tyne.
- (60) *Municipal Engineering*, Indianapolis, Ind., 25c.
- (61) *Proceedings*, Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.
- (62) *American Manufacturer and Iron World*, 59 Ninth St., Pittsburg, Pa.
- (63) *Minutes of Proceedings*, Inst. C. E., London, England.
- (64) *Power*, New York City, 20c.
- (65) *Official Proceedings*, New York Railroad Club, Brooklyn, N. Y., 15c.
- (66) *Journal of Gas Lighting*, London, England, 15c.
- (67) *Cement and Engineering News*, Chicago, Ill., 25c.
- (68) *Mining Journal*, London, England.
- (69) *Mill Owners*, New York City, 10c.
- (70) *Engineering Review*, New York City, 10c.
- (71) *Journal*, Iron and Steel Inst., London, England.

## LIST OF ARTICLES.

**Bridge.**

- Concrete Bridge over the Big Muddy River, Illinois Central R. R.\* H. W. Parahurst M. Am. Soc. C. E. (13) Nov. 12.  
 The Protection of Steel in Ballasted Floor Bridges.\* (13) Nov. 12.  
 Armoured Concrete Foot-Bridge at Toulouse.\* (12) Nov. 13.  
 Standard Short-Span Bridges on the Atchison, Topeka & Santa Fe Railway.\* (14) Nov. 14.  
 A Comparison of the Requirements of Recent Railway Bridge Specifications. A. H. Heller. (13) Nov. 19.  
 An American Bridge Built of German Steel and Launched at a Shipyard.\* P. S. Hildreth. (13) Nov. 19.  
 The Limits of Working Stress in Bridges. (12) Serial beginning Nov. 20.  
 Comparative Eye-Bar and Wire Cable Designs for a Highway Bridge over the Rhine at Cologne.\* (15) Nov. 20.  
 The Ambridge Plant of the American Bridge Company.\* (14) Serial beginning Nov. 21.  
 Ballasted Floors on the Atchison, Topeka & Santa Fe (bridge floors).\* (40) Nov. 27.  
 The Contessville Viaduct of the Pennsylvania Railroad.\* (40) Nov. 27.  
 Eye Bars or Cables for Manhattan Bridge. R. S. Buck. (15) Dec. 4.  
 The Manhattan Bridge over the East River, New York.\* (15) Dec. 4.  
 Erection of the Turtipar Bridge on Barges and Cantilever Falsework. (14) Dec. 5.  
 Le Pont suspendu de Vermaison, sur le Rhone \* Léon Griveaud. (35) Nov.  
 Ponts à Transbordeur.\* G. Leinekugel Le Cocq. (33) Serial beginning Nov. 21.

**Electrical.**

- The Heyland Induction Motor.\* A. S. Langsdorf. (Paper read before the Engineers' Club of St. Louis.) (1) Sept.  
 The Electrical Equipment of a Gold Dredge.\* Ralph L. Montagu. (42) Oct.  
 The Cathode Ray Alternating Current Wave Indicator.\* Harris J. Ryan. (42) Oct.  
 The Factors Which Affect the Energy Losses in Armature Cores.\* J. Walter Esterline and C. E. Reid. (42) Oct.  
 Central Station Economies. W. E. Goldsborough and P. E. Fansler.\* (42) Oct.  
 The Legalized Standard of Electromotive Force. Henry S. Carhart. (42) Oct.  
 Magnetic Units and Other Subjects That Might Occupy Attention at the Next International Electrical Congress. A. E. Kennelly. (42) Oct.  
 Electric Motors for Centrifugal Pumps and Fans. Aug. J. Bowie, Jr. (42) Oct.  
 An Efficient High-Pressure Water-Power Transmission Plant.\* George J. Henry, Jr., and Joseph N. Le Conte. (42) Oct.  
 The E. C. A. Proposed Model Wiring Specification. (26) Nov. 6.  
 Single-Phase Motors for Traction. Giorgio Finzi. (26) Serial beginning Nov. 6.  
 Reversing Motors for Live Rollers.\* (22) Nov. 6.  
 Recent Developments of the Metropolitan Electric Supply Co.'s Installations.\* (26) Serial beginning Nov. 13.  
 On the Use of Capacities as Multipliers in Connection with Electrostatic Voltmeters on Alternating-Current Circuits. E. W. Merchant and G. W. Worrall. (Abstract of Paper read before the British Assoc. for the Advancement of Science.) (26) Nov. 13.  
 Notes on the Theory of Parallel Running of Synchronous Machinery. H. C. Leake. (26) Nov. 13.  
 An Unusual Form of Capillary Electrometer.\* Emile Guarini. (19) Nov. 14.  
 Electric Pumping Plant for De Beers Consolidated Mines, Kimberley.\* (26) Nov. 13; (47) Nov. 14.  
 Faure Type Accumulators. (19) Nov. 14.  
 Distribution of Current in Three Phase Systems.\* F. Hardie Jeannin. (27) Nov. 14.  
 Calculation of the Apparent Inductance of Armature Coils.\* C. C. Hawkins. (27) Serial beginning Nov. 14.  
 The Relative Reliability of Wireless and Wire Telegraph Systems.\* Reginald A. Fessenden. (27) Nov. 14.  
 New Generating Station of the Rochester Gas and Electric Company.\* (27) Nov. 14.  
 The Design of Direct-Current Machinery.\* Val. A. Fynn. (26) Serial beginning Nov. 21.  
 The Choice of Wattmeters. Paul MacGahan. (27) Nov. 21.  
 Transposition of Telephone Lines: Cross-Talk and Induction.\* Frank F. Fowle. (Abstract of Paper read before the Assoc. of Ry. Telegraph Supts.) (27) Nov. 21.  
 Surveys for Electrolysis, and Their Results.\* D. H. Maury. (24) Nov. 23.  
 The Greenhill Electricity Works, Oldham Corporation.\* (26) Serial beginning Nov. 27.  
 The Edison Accumulator for Automobiles.\* W. Hibbert. Assoc. M. Inst. E. E. (Paper read before the Inst. of Elec. Engrs.) (26) Serial beginning Nov. 27.  
 Electricity in Manufacturing Plants. Walter M. McFarland. (Abstract of Paper read before the Soc. of Naval Architects and Marine Engrs.) (14) Nov. 28.  
 Testing Alternators under Full Load Conditions.\* W. L. Waters. (27) Nov. 28.  
 Wireless Fire Alarm Signalling Apparatus.\* (27) Nov. 28.  
 Recent Progress Abroad in Wireless Telephony.\* (27) Nov. 28.  
 Large Gas Engine Electrical Plant in Germany.\* (27) Nov. 28.  
 The Murphy High Potential Interrupter.\* A. Frederick Collins. (27) Nov. 28.



**Electrical (Continued).**

- Notes on Certain Three-Wire Systems.\* Charles T. Mosman. (47) Nov. 28.  
 Box Electric Rock Drill.\* (68) Nov. 28.  
 Some New Experiments in Syntonic Wireless Telegraphy in the Italian Navy. (19) Nov. 28.  
 A Central Electric Power Plant of the Coal-Mining Department of the Delaware, Lacka-  
 wanna & Western Railroad Co., at Scranton.\* H. M. Warren. (45) Dec.  
 Recent Developments in Niagara Power.\* H. W. Buck. (10) Dec.  
 Electric Convection. J. Frank Meyer. (3) Dec.  
 Electric Equipment of Iron Works. (41) Dec.  
 Recent English Alternating Current Machines.\* (17) Dec. 5; (27) Dec. 5.  
 Montreal, the Greatest Centre of Transmitted Power.\* Alton D. Adams. (27) Serial  
 beginning Dec. 5.  
 Methods of Signaling and Operating in Telephone Exchanges.\* Kempster B. Miller and  
 Charles S. Winston. (27) Serial beginning Dec. 5.  
 Telephone Transmitters.\* Arthur V. Abbott. (27) Serial beginning Dec. 5.  
 Usine Hydro-Electrique d'Avignonnet sur le Drac (Isère). A. Dumas. (33) Nov. 14.  
 La Construction des Dynamos en Allemagne.\* C. F. Guilbert. (36) Serial beginning  
 Nov. 25.

**Marine.**

- The Economy of Large Ships. A. W. Robinson, M. Can. Soc. C. E. (5) Vol. 16, Pt. 2.  
 The Stone-Lloyd System of Ship's Bulkhead Gear. (11) Nov. 6.  
 Oil-Motor Boat for the Uganda Railway Company.\* (11) Nov. 6.  
 The Carena Dry-Dock, Argentine Republic.\* (14) Nov. 14.  
 German Marine Boiler Construction. Frank C. Perkins. (19) Nov. 14.  
 The Submarine Boat Protector.\* (12) Nov. 20.  
 The Boilers of the *Maine*. (Favorable report on Niclausse Water Tube Type. (20)  
 Nov. 26.  
 Non-Corrosive Nickel-Steel Boiler Tubes. Albert Ladd Colby, M. Am. Soc. M. E. (Paper  
 read before the Soc. of Naval Archts. and Marine Engrs.) (13) Nov. 26.  
 The Concrete Dry Dock at Kiel, Germany; Subaqueous Construction by Floating  
 Pneumatic Caisson.\* (13) Dec. 3.  
 Notes on Side-Launchings. Wm. G. Groesbeck. (Paper read before the Soc. of Naval  
 Archts. and Marine Engrs.) (13) Dec. 3.

**Mechanical.**

- The Cost of Open-Hearth Steels as Affected by Using Blast Furnace Gas in Gas Engines.  
 Peter Eyermann. (Paper read before the Civ. Engineers' Club of Cleveland.) (1)  
 Sept.; Abstract (22) Nov. 6.  
 Central Station Economies. W. E. Goldsborough and P. E. Fansler.\* (42) Oct.  
 Anthracite Gas Producers for Power Purposes. (22) Serial beginning Oct. 30.  
 Reactions and Temperatures in By-Product Coke Ovens. (22) Oct. 30.  
 Centrifugal Fans. J. H. Kinealy. (70) Serial beginning Nov.  
 An Economizer Discussion. (Fuel Economizers for Power Stations.) Edwin B. Katte,  
 A. H. Blackburn, Wm. Downs, R. D. Tomlinson and J. E. Moulthrop. (65) Nov. 1.  
 Enlargements and Improvements at the Stafford Corporation Gas-Works.\* (66)  
 Nov. 3.  
 A New Percussive Drill.\* (22) Nov. 6.  
 Air Gas. (12) Nov. 6.  
 Circulation in Water-Tube Boilers.\* (12) Nov. 6.  
 Hammers Used in Die-Forging. (11) Nov. 6.  
 Reversing Motors for Live Rollers.\* (22) Nov. 6.  
 Steam and the Steam Engine. John Batey. (Abstract of Paper read before the Bir-  
 mingham Assoc. of Mech. Engrs.) (22) Nov. 6.  
 Carbonizing Larger Charges of Coal. H. Ries. (62) Nov. 12.  
 Machine for Sinking Screw Piles.\* (20) Nov. 12.  
 Dunlop's Self-Contained Self-Regulating Gas Plant.\* (47) Nov. 14.  
 Pickling Castings. (47) Nov. 14.  
 Different Gases in Gas Engines. Alfred H. White. (Lecture delivered before the Amer.  
 Gas Light Assoc.) (24) Nov. 16.  
 The Pitting Rust of Iron. W. H. Birchmore. (24) Nov. 16.  
 Central Station Heating. D. F. McGee. (Paper read before the Iowa State Elec. Light  
 Assoc.) (24) Nov. 16.  
 The Economic Advantages of Working a Carburetted Water Gas Plant in Conjunction  
 with a Coal-Gas Plant. S. Carpenter. (Paper read before the Southern District  
 Assoc. of Gas Engrs. and Mgrs.) (66) Nov. 17.  
 Twenty Ton Breakdown Crane.\* (12) Nov. 20.  
 Pierson's "Suction" Gas-Producer.\* (11) Nov. 20.  
 A New Feed-Water Regulator.\* (12) Nov. 20.  
 Speeds and Gearing of Machine Tools.\* P. V. Vernon. (Paper read before the Man-  
 chester Assoc. of Engrs.) (47) Nov. 21.  
 Requirements of Machine Tool Operation, with Special Reference to the Motor Drive.\*  
 Charles Day. (Abstract of Paper presented before the N. Y. Elec. Soc.) (18)  
 Nov. 21.  
 The Ambridge Plant of the American Bridge Company.\* (14) Serial beginning Nov. 21.

\* Illustrated.





**Mechanical (Continued).**

- The Hot Water Meter for Evaporative Tests of Boilers.\* John A. Drew. (14 Nov. 21; (20) Nov. 19; (70) Nov.
- Flow of Gas in Long Pipes and under High Pressures. (66) Nov. 24
- The American Separately Fired Superheater.\* (20) Nov. 26.
- Motors Required to Drive Power Presses. (20) Nov. 26.
- The Wagner Cold Sawing Machines.\* (20) Nov. 26; (62) Nov. 26.
- Seamless Steel Tanks Pressed from Plates.\* (20) Nov. 26.
- The Use of Compressed Air for Operating the Contractor's Plant at the Wachuset Dam.\* (13) Nov. 26.
- Non-Corrosive Nickel-Steel Boiler Tubes. Albert Ladd Colby, M. Am. Soc. M. E. (Paper read before the Soc. of Naval Archts. and Marine Engrs.) (13) Nov. 26; Abstract (20) Nov. 26; (40) Nov. 27.
- Four-Stage Air Compressor for 850-Lbs. Pressure.\* (13) Nov. 26.
- An Apparatus for Measuring Gas Leakage.\* Emile Guarini. (13) Nov. 26.
- Band Brakes.\* J. S. V. Bickford. (12) Nov. 27.
- Notes on the Arrangement and Construction of Steam Pipes and Their Connections.\* Robert C. Monteagle. (Paper read before the Soc. of Naval Archts. and Marine Engrs.) (13) Nov. 26.
- Centrifugal Pumps.\* Thomas E. Stanton. (Paper read before the Inst. of Mech. Engrs.) (11) Nov. 27.
- The Hydraulic Plant for Drawing Steel Shells at the Imperial Arsenal, Osaka, Japan.\* Gompei Kuwada. (14) Nov. 28.
- Superheated Steam.\* F. J. Rowan. (Paper read before the Inst. of Engrs. and Ship-builders in Scotland.) (47) Serial beginning Nov. 28.
- The Science of Steam Generation.\* F. J. Rowan, Assoc. M. Inst. C. E. (10) Dec.
- Power for Large Machine Tools.\* Charles H. Benjamin. (10) Dec.
- Heavy Service Lathe.\* (12) Nov. 27.
- The Use of Fly Wheels upon Machine Tools. J. C. Steen. (25) Dec.
- An Interesting Set of Screw Machine Tools.\* W. E. Willis. (41) Dec.
- A Quarter-Screw Rope Drive.\* (41) Dec.
- Universal Screw Machine, 2 Inches by 12 Inches.\* (30) Dec.
- Aerial Tramways. Stephen De Zomboria. (Paper read before the Amer. Min. Cong.) (45) Dec.
- Coal Washing by the Stewart System.\* David T. Blakey. (45) Dec.
- Washing Montana Coal.\* J. V. Schaefer. (45) Dec.
- The Thwaite Blast Furnace Gas Cleaning Plant.\* (20) Dec. 3.
- The Tindel-Morris High Duty Cold Saw.\* (20) Dec. 3.
- The Westinghouse Blowing Engine.\* (20) Dec. 3.
- Steam Pipes and Their Connections.\* Robert C. Monteagle. (Paper read before the Soc. of Naval Architects and Marine Engrs.) (20) Dec. 3.
- Alcohol as a Motive Power. (From the Fr. of M. O. Boudouard, in *Revue de Chimie Industrielle*.) (10) Dec. 5.
- A System of Handling Sand Mechanically for Cyanide Vats.\* Charles Butters and Albert F. Crank. (Abstract of Paper read before the Inst. of Min. and Metal.) (16) Dec. 5.
- The Lebaudy Airship.\* (46) Dec. 5.
- A Simple Superheater.\* (17) Dec. 5.
- A Gantry Crane with Double Cantilever Bridge.\* (13) Dec. 3; (20) Dec. 3; (14) Dec. 5.
- The Plant of the Northampton Portland Cement Company.\* Richard K. Meade. (14) Dec. 5.
- Concrete Tanks for Gasholders. (24) Dec. 7.
- Appareil Électrique pour le Déchargement des Cornues à Gaz. (34) Nov
- Essai des Canalisations par la Fumée. (35) Serial beginning Nov.
- Récentes Expériences sur l'Aviation.\* (33) Nov. 7.
- Nouveau Type de Machine à Vapeur.\* (36) Nov. 10.
- Appareil Auto-Régulateur de Tirage des Foyers des Chaudières à Vapeur.\* H. Noalhat. (36) Nov. 10.
- Emploi Économique des Moteurs à Gaz Pauvre.\* F. Gramyr. (36) Nov. 10.
- L'Avance à l'Allumage et la Durée des Explosions dans les Moteurs à Explosions. J. Petin. (33) Nov. 14.
- Machine pour le Travail des Hélices.\* (33) Nov. 14.

**Metallurgical.**

- The Cost of Open-Hearth Steel As Affected by Using Blast Furnace Gas in Gas Engines. Peter Evermann. (Paper read before the Civ. Engineers' Club of Cleveland.) (1) Sept.; Abstract (22) Nov. 6.
- Use of Thermite in Gaining of Metals. B. Palmer Caldwell. (62) Nov. 12.
- Preventing Pipes and Blow Holes in Ingots and Castings. F. C. Weber. (20) Nov. 12.
- A Blast Furnace with Continuous Flow of Metal.\* (20) Nov. 12.
- A Brief Study of the Ferro Metals and Their Electrical Manufacture. Auguste J. Rossi. (20) Nov. 12.
- Alumino-Thermics and Rail Welding.\* Hans Goldschmidt. (17) Nov. 14.
- Electrolytic Copper Refining. Wilder D. Bancroft. (Abstract of Paper read before the Amer. Electrochemical Soc.) (16) Nov. 14.



**Metallurgical (Continued).**

- Lead Smelting in Spain.\* Hjalmar Eriksson. (16) Nov. 14.  
 Grinding Machines Used at Kalgoorlie. W. E. Simpson. (Abstract of Paper read before the Inst. of Min. and Metal.) (16) Nov. 14.  
 Manganese Ore as a Desulphurizing Agent in the Foundry. (20) Nov. 19.  
 The Analysis of High Speed Steels. (11) Nov. 20.  
 The Precipitation of Gold from Cyanide Solutions. W. A. Caldecott and E. H. Johnson. (16) Nov. 21.  
 Merton's Calcining Furnace.\* F. Danvers Power. (16) Nov. 21.  
 Treatment of Telluride Ores by Dry-Crushing and Roasting, at Kalgoorlie, Western Australia.\* W. Evan Simpson. (Paper read before the Inst. of Min. and Metal.) (68) Serial beginning Nov. 7; Abstract (16) Nov. 21.  
 Manufacture of Sound Casting by Means of Thermit. J. B. Nau. (62) Nov. 26.  
 Consumption of Zinc in Cyanide Plants. Walter H. Virgoe. (Abstract of Paper in the *Journal of the Chemical, Metal, and Min. Soc. of South Africa*.) (16) Nov. 28.  
 The Ferraris Ball Mill (an ore-crushing mill).\* Walter Renton Ingalls. (16) Nov. 28.  
 Note on the Microstructure of Steel. James E. Howard. (62) Dec. 3.  
 Simmes Process at the Consolidated Mercur Gold Mines.\* George Moore. (16) Dec. 5.

**Military.**

- The Hydraulic Plant for Drawing Steel Shells, at the Imperial Arsenal, Osaka, Japan.\* Gompei Kuwada. (14) Nov. 28.  
 Perfectionnements Réalisés dans les Armes de Chasse.\* G. Boëtto. (33) Nov. 7.  
 Essais sur la Stabilité des Poudres et des Divers Explosifs à Base de Nitrocellulose. (33) Nov. 21.

**Mining.**

- Some Notes on Certain Underground Hoisting Problems on the Witwatersrand. A. W. K. Pierce. (42) Oct.  
 The Electrical Equipment of a Gold Dredge.\* Ralph L. Montagu. (42) Oct.  
 Notes on Coal Cutting Machinery. A. Simon. (Paper read before the South Staffordshire and East Worcestershire Inst. of Min. Engrs.) (22) Oct. 30; (57) Nov. 6; (68) Nov. 7.  
 The Lindeman New Electric Safety Lamp with Chelin Accumulators.\* (22) Nov. 13.  
 Electric Pumping Plant for De Beers Consolidated Mines, Kimberley.\* (26) Nov. 13; (47) Nov. 14.  
 Hoisting Plant and Steel Shaft House for the Oliver Iron Mining Co., at Ely, Minn.\* (13) Nov. 19.  
 New Endless-Rope Haulage Plant at Tennessee Coal, Iron & Railroad Co. in Alabama. Erskine Ramsay. (45) Dec.  
 Coal Washing by the Stewart System.\* David T. Blakey. (45) Dec.  
 Washing Montana Coal.\* J. V. Schaefer. (45) Dec.  
 Lining Shafts with Concrete and Expanded Metal (shafts in mines).\* (45) Dec.  
 Aerial Tramways. Stephen De Zomboria. (Paper read before the Amer. Min. Cong.) (45) Dec.

**Railroad.**

- The Construction of the Great Northern Railway of Canada, 1899-1900.\* J. M. Shanly. M. Can. Soc. C. E. (5) Vol. 16, Pt. 1.  
 Competition of Steam vs. Electric Parallels. C. H. Davis. M. Can. Soc. C. E. (5) Vol. 16, Pt. 1.  
 Concerning Leaky Fireboxes. T. S. Reilly. (61) Oct. 20.  
 Specifications for Boiler Tubes. (61) Oct. 20.  
 New Carriage Bogie: Great Western Railway.\* (21) Nov.  
 Electricity in Railway Signalling. (21) Serial beginning Nov.  
 30-ton Private Owners' Wagons. (Drawings and Specification by James Holden, M. Inst. C. E.) (21) Nov.  
 1st and 3rd Class Composite Dining Carriage: Great Northern Railway.\* (21) Nov.  
 Some Notes on Acceleration—Electric v. Steam. P. Walter d'Alton. M. Inst. C. E., and John Mannheim. (12) Nov. 6.  
 Heavy Goods Engine for the Bengal Nagpur Railway.\* (12) Nov. 6.  
 The Use of Three-Position, Separate Home and Distant and Overlapping Automatic Block Signals. (Report of Committee of the Ry. Signal Club.) (13) Nov. 12.  
 Drop-Bottom, Flat-Floor Gondola Cars for the Chicago, Burlington & Quincy Ry. (13) Nov. 12.  
 The Use of Distant Signals at Interlocking Plants. (Report of Committee of the Ry. Signal Club.) (13) Nov. 12.  
 Fish Car for the Great Central Railway of England.\* (40) Nov. 13.  
 Two-Cylinder Compound Locomotives for the Wabash.\* (40) Nov. 13.  
 Signal Circuits.\* (Report of a committee to the Ry. Signal Assoc.) (18) Nov. 21; (40) Nov. 13.  
 Automatic Signals for Single Track. (Report of a committee to the Ry. Signal Assoc.) (18) Nov. 21; (40) Nov. 13.  
 Tandem-Compound Consolidations for the Colorado & Southern.\* (15) Nov. 13.  
 Notes from the Midletown Shops of the New York, Ontario & Western.\* (15) Nov. 13.

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- Electrically Operated Roundhouse Turntables.\* Frank C. Perkins. (15) Nov. 13.  
 Aluminio-Thermics and Rail Welding.\* Hans Goldschmidt. (17) Nov. 14.  
 Enlarged Power Plant of the Chicago, Milwaukee & St. Paul Railway, at West Milwaukee.\* (14) Nov. 14.  
 Manhattan and Weehawken Shafts of the Pennsylvania Railroad Tunnels under the North River.\* (14) Nov. 14.  
 The Railway Landslide at Cleveland.\* (14) Nov. 14.  
 Compressed Acetylene for Lighting Railway Cars. E. G. Fisher. (Abstract of Paper read before the International Acetylene Assoc. in Chicago.) (18) Nov. 14.  
 Recent Progress in the Design of Locomotive Front-Ends. W. F. M. Goss, M. Am. Soc. M. E. (Extract from Paper read before the Central R. R. Club.) (13) Nov. 19; (15) Nov. 13.  
 The Railway Tie Question. (From report of the proceedings of the annual convention of the Roadmasters' and Maintenance of Way Assoc.) (13) Nov. 19.  
 Eight-Wheel Passenger Locomotive for the Frisco System.\* (40) Nov. 20.  
 Locomotive Repair Shops at Danville, Ill.\* (40) Nov. 20.  
 The Stack Problem.\* (40) Nov. 20.  
 Extensions of the Buffalo & Susquehanna Railroad.\* Elisha Walker. (14) Nov. 21.  
 The Oaklawn Shops of the Chicago & Eastern Illinois Railroad.\* (14) Nov. 21.  
 Direct-Current Traction at 1,200 Volts in France.\* (27) Nov. 21.  
 Steel-Frame Side-Door Suburban Cars; Illinois Central R. R.\* (13) Nov. 26.  
 The Locomotive Testing Plant of the Pennsylvania R. R. at the St. Louis Exposition. (13) Nov. 26.  
 The Locomotive Testing Plant at St. Louis. (40) Nov. 27.  
 Ballasted Floors on the Atchison, Topeka & Santa Fe (bridge floors).\* (40) Nov. 27.  
 The "Santa Fe" Type Tandem Compound.\* (40) Nov. 27.  
 Delaware, Lackawanna & Western Track Elevation in Newark and Harrison, N. J.\* (15) Nov. 27.  
 Hudson River Tunnel of the New York & Jersey Railroad.\* (15) Nov. 27.  
 Freight Business on Electric Railroads. J. D. Hawks. (15) Nov. 27.  
 Requirements for Tank Cars Running over the Pennsylvania Lines. (15) Nov. 27.  
 Automatic Signalling on the District Railway.\* (12) Nov. 27.  
 New L. S. & M. S. Yards at Elkhart and Collinwood.\* (18) Nov. 28.  
 Some Experiments with Stacks and Exhaust Pipes.\* T. H. Symington. (Abstract of Paper presented before the Richmond Ry. Club.) (18) Nov. 28; (47) Nov. 28.  
 The Essentials of a Modern Railway Paint Shop. (Abstract of Paper presented before the Ry. Club of Pittsburgh.) (18) Nov. 28.  
 Electric Traction for the New York Central Railroad.\* (27) Nov. 28; (17) Nov. 28.  
 The Latest Work at Zossen.\* (27) Nov. 28; (17) Nov. 28.  
 The Vienna Metropolitan Railway.\* Emile Guarini. (10) Serial beginning Nov. 28.  
 Multi-Cylinder Locomotives.\* J. F. Gairns. (10) Serial beginning Dec.  
 Special Features in the Design of Locomotive Boilers and Fireboxes.\* Chas. S. Lake. (9) Dec.  
 Railway Making in China.\* Thos. H. Reid. (9) Dec.  
 New Passenger Locomotive: Wabash Railroad: 4-4-0 Type.\* (25) Dec.  
 Heavy Freight Locomotive: Lake Shore & Michigan Southern Railway: 2-8-0 Type.\* (25) Dec.  
 Powerful Passenger Locomotive: 4-6-2 (Pacific) Type: Atchison, Topeka & Santa Fe Railroad.\* (25) Dec.  
 Four-Cylinder Compound Locomotives. Alfred G. de Glehn. (25) Dec..  
 Hydraulic Drop Table.\* (25) Dec.  
 Switching Locomotive—Great Northern Railway.\* (39) Dec.  
 Steel Gondola Cars of the Chicago, Burlington & Quincy Railway.\* (39) Dec.  
 Railroad Shop Tools.\* Charles H. Fitch. (39) Dec.  
 The Trend of Locomotive Proportions.\* (39) Dec.  
 The Washington Union Station.\* (15) Dec. 4.  
 Pennsylvania Railroad's Testing Plant at St. Louis. (15) Dec. 4.  
 The New York Central Wrecking Outfits.\* (15) Dec. 4.  
 Delaware, Lackawanna & Western Railroad Improvements at Newark and Harrison, N. J.\* William H. Spiers. (40) Dec. 4.  
 Tandem Compound Express Locomotive—Russian Empire Railways.\* (19) Dec. 5.  
 Rebuilding a Long and High Wrecked Trestle.\* (14) Dec. 5.  
 Locomotive Repair Shops of the P. & L. E. R. R., McKees Rocks, Pa.\* (18) Serial beginning Dec. 5.  
 Some Tunnel Work on the Pittsburgh, Carnegie & Western R. R.\* (18) Dec. 5.  
 Locomotive Proportion. F. K. Caswell. (18) Dec. 5.  
 Note sur l'Application Générale du Chauffage des Trains par la Vapeur et l'Air Comprimé Combinés sur le Réseau de l'Est. M. Laucronon. (38) Nov.  
 Automotrices à Essence (Système Daimler) des Chemins de Fer de l'État du Wurtemberg. M. Fischer. (38) Nov.  
 Locomotive Electrique et Voitures Automotrices du Chemin de Fer de la Valteline.\* (34) Nov.  
 Les Récents Agrandissements des Gares de la Région Nord de Berlin.\* (33) Nov. 7.  
 Transport par Chemins de Fer des Blessés et Malades Militaires.\* (36) Nov. 25.



**Railroad, Street.**

- The Multiple Supply Electric Railway System. (26) Nov. 6.  
 Brussels Electric Tramways.\* (26) Nov. 6.  
 The Repair Shops of the St. Louis Transit Company.\* (17) Nov. 14.  
 New York City Transportation—A Look Ahead. (15) Nov. 20.  
 Cincinnati Interurban Development.\* (17) Serial beginning Nov. 21.  
 The Heating of Railway Motors.\* S. T. Dodd and M. C. Canfield. (17) Nov. 21.  
 Melting Sleet on a Third Rail. W. A. Del Mar. (27) Nov. 21.  
 Trackless Trolley Experiments at Scranton, Pa.\* (27) Nov. 21; (17) Nov. 14.  
 Triple-Expansion Engine for Newcastle Tramways.\* (11) Nov. 27.  
 Sleet-Cutting Machines Adopted for Manhattan.\* (17) Nov. 28.  
 A New Electric Buffet Car.\* (17) Nov. 28.  
 Standard Bottom framing of Brill 30-ft. 8-in. Semi-Convertible Car.\* (17) Nov. 28.  
 The Metropolitan Railway of Paris.\* Paul Letheule. (6) Dec.  
 Motors as Emergency Brakes.\* Cale Gough. (17) Dec. 5.  
 The System of the Camden & Suburban Railway Company.\* (17) Dec. 5.  
 Reconstruction of Olive Street Tracks in St. Louis.\* (17) Dec. 5.  
 Brill Sweepers for the Metropolitan Street Railway.\* (17) Dec. 5.  
 Single-Phase Motors for Traction.\* (27) Dec. 5.  
 New Motor-Car Equipment of the Central London Railway.\* (27) Dec. 5.  
 Isolateur Interrupteur pour les Lignes Électriques Aériennes.\* (33) Nov. 21.  
 La Traction Électrique des Trains à Grande Vitesse. Émile Dieudonné. (36) Nov. 25.

**Sanitary.**

- Sewage Disposal. Chas. H. Rust, M. Can. Soc. C. E. (5) Vol. 16, Pt. 2.  
 Sewerage and Drainage of the Blair Building, New York.\* (70) Nov.  
 Heating a Country Residence by a Steam Boiler and a Warm Air Furnace.\* (70) Nov.  
 Heating and Ventilation of the American Blower Company's New Office Building.\* (70) Nov.  
 Tunneling for a Sewer beneath the Cochituate Aqueduct.\* J. H. Kimball. (14) Nov. 14.  
 Winter Treatment of Sewage Beds. (14) Nov. 14.  
 Biological Purification of Sewage Water.\* (16) Nov. 14.  
 Method and Cost of Constructing a Concrete Sewer Having a Brick Arch at Medford, Mass.\* (13) Nov. 19.  
 Construction of the Sixty-Fourth Street Sewer Tunnel, Brooklyn.\* (14) Serial beginning Nov. 21.  
 Prevention of Contagion in Passenger Cars. (15) Nov. 20.  
 La Désinfection des Navires et des Marchandises. P. Carles. (Abstract of Report by Prof. Proust and P. Faivre.) (36) Nov. 10.  
 Transport par Chemins de Fer des Blessés et Malades Militaires.\* (36) Nov. 25.

**Structural.**

- Data and Notes Derived from Tests on Cement and also on Concrete Taken from Regular Batches Used in Actual Works.\* James S. Costigan, A. M. Can. Soc. C. E. (5) Vol. 16, Pt. 1.  
 Quantity of Water to Use in Gauging Mortars. Frederick W. Taylor and Sanford E. Thompson, Assoc. M. Am. Soc. C. E. (67) Nov.  
 A New Method of Obtaining the Tensile Strength of Cement.\* Arthur U. Johnson. (14) Nov. 14.  
 Effect of Clay and Loam on Cement Mortar. C. E. Sherman. (13) Nov. 19.  
 Locomotive Repair Shops at Danville, Ill.\* (40) Nov. 20.  
 Ferrocement Steel-Concrete Fire Proof Building Material. (20) Nov. 26.  
 Roofing Existing Shops While Work is Proceeding.\* R. H. Fowler. (Paper read before the Inst. of Mech. Engrs.) (11) Nov. 27; (12) Nov. 27.  
 An Armored Concrete Building for the College of Music, Cincinnati.\* (14) Nov. 28.  
 Mixing and Placing Concrete.\* Samuel H. Lea, M. Am. Soc. C. E. (45) Dec.  
 The Production and Transportation of the Granite Columns for St. John's Cathedral, New York City.\* (13) Dec. 3.  
 Underpinning an Old Office Building on Broadway, New York.\* (14) Dec. 5.  
 Steel Roof Trusses in the Hotel Astor, New York.\* (14) Dec. 5.  
 The Southern Pacific Elevator, Galveston, Texas.\* (14) Dec. 5.  
 The Plant of the Northampton Portland Cement Company.\* Richard R. Meade. (14) Dec. 5.  
 Petite Maison de Commerce et de Rapport, à Meudon (Seine-et-Oise).\* E. Rivolaen. (35) Nov.

**Water Supply.**

- On the Measurement of Water by a Small Venturi Meter.\* E. G. Coker and T. P. Strickland. (5) Vol. 16, Pt. 1.  
 Description of a Dam and Accompanying Works Built for the Water Commissioners, London, Ont., at Springbank.\* J. A. Heaman, S. Can. Soc. C. E. (5) Vol. 16, Pt. 1.  
 An Efficient High-Pressure Water-Power Transmission Plant.\* George J. Henry, Jr., and Joseph N. Le Conte. (42) Oct.  
 Covering an Old Reservoir at Brookline, Mass. F. I. Winslow. (13) Nov. 12.



**Water Supply (Continued).**

- The California or "Stove-Pipe" Method of Well Construction for Water Supply.\* Charles S. Slichter. (13) Nov. 12.
- Raising Water by Compressed Air.\* William H. Maxwell, Assoc. M. Inst. C. E. Paper read before the British Assoc. of Water-Works Engrs. (11) Nov. 13.
- New Generating Station of the Rochester Gas and Electric Company.\* (27) Nov. 14.
- Southern California Mountain Water Company's Reservoirs, Dams and Pipe Lines.\* (14) Nov. 14.
- Present Types of Steam Turbines. A. R. Dodge. (Abstract of Paper read before the N. E. Cotton Mfrs. Assoc.) (18) Nov. 14.
- Tangential Waterwheel Efficiencies: Being an Experimental Investigation of the Relative Values of Different Bucket Shapes.\* George J. Henry, Jr., M. A. S. M. E. (Paper read before the Pacific Coast Elec. Transmission Assoc.) (19) Serial beginning Nov. 14.
- The Production and Uses of Ozone.\* (12) Nov. 20.
- The Water Supply of the Lackawanna Steel Works.\* (14) Nov. 21.
- Hydraulic Features of the Plant of the Niagara Falls Power Company.\* (14) Serial beginning Nov. 21.
- Changes in the Settling Basins and the New Hydraulic Dredge of the St. Louis Water-Works.\* E. E. Wall. (13) Nov. 26.
- The Staines Reservoirs and Aqueducts of the London Water Works.\* (14) Nov. 28.
- Recent Developments in Niagara Power.\* H. W. Buck. (10) Dec.
- The Water Powers of British Columbia.\* E. Jacobs. (9) Dec.
- The Use of Sulphate of Iron at Lorain (for filtering water). C. Arthur Brown. (14) Dec. 5.
- A New Disk Water Meter.\* Freeman Weston Hood and Henry R. Worthington. (14) Dec. 5.
- Montreal, the Greatest Centre of Transmitted Power.\* Alton D. Adams. (27) Serial beginning Dec. 5.
- The Cedar Grove Reservoir of the Newark, N. J., Waterworks.\* (14) Serial beginning Dec. 5.
- Les Puits Filtrants et Leur Application aux Grands Débits Permanents.\* Th. Verstraeten. (31) 3<sup>e</sup> Série, Tome II.
- Usine Hydro-Électrique d'Avignonnet sur le Drac (Isère).\* A. Dumas. (33) Nov. 14.

**Waterways.**

- Electric Towing on the Erie Canal.\* (27) Nov. 14.
- Electric Traction on Canals.\* (14) Nov. 14.
- Trolley Traction on the Miami Canal.\* (27) Nov. 14.
- "Electric Mule" on Erie Canal.\* (17) Nov. 14.
- Other Ship Canals than Panama. (46) Dec. 5.
- Le Nouveau Projet de Loi sur l'Outillage National Amélioration des Voies Navigables et des Ports.\* Paul Léon. (33) Serial beginning Nov. 7.
- Bruxelles Maritime.\* Emile Guarini. (36) Nov. 25.

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\* Illustrated.





AMERICAN SOCIETY  
OF  
CIVIL ENGINEERS.

INSTITUTED NOVEMBER 5, 1852.

CONSTITUTION AND LIST OF  
MEMBERS.

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FEBRUARY 10TH, 1903.

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HOUSE OF THE SOCIETY, 220 WEST FIFTY-SEVENTH STREET,  
NEW YORK.



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# HOUSE OF THE SOCIETY,

220 West 57th Street.

Cable Address:  
"Ceas, New York."

Telephone:  
533 Columbus.

## CALENDAR.

1903-04.

DATES OF MEETINGS IN BOLD-FACED TYPE.

FEBRUARY							JUNE							OCTOBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
1	2	3	<b>4</b>	5	6	7	..	1	2	3	4	5	6	..	..	..	..	1	2	3
8	9	10	11	12	13	14	7	8	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	13	4	5	6	<b>7</b>	8	9	10
15	16	17	<b>18</b>	19	20	21	14	15	16	17	18	19	20	11	12	13	14	15	16	17
22	23	24	25	26	27	28	21	22	23	24	25	26	27	18	19	20	<b>21</b>	22	23	24
..	..	..	..	..	..	..	28	29	30	..	..	..	..	25	26	27	28	29	30	31
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
MARCH							JULY							NOVEMBER						
1	2	3	<b>4</b>	5	6	7	..	..	..	1	2	3	4	1	2	3	<b>4</b>	5	6	7
8	9	10	11	12	13	14	5	6	7	8	9	10	11	8	9	10	11	12	13	14
15	16	17	<b>18</b>	19	20	21	12	13	14	15	16	17	18	15	16	17	<b>18</b>	19	20	21
22	23	24	25	26	27	28	19	20	21	22	23	24	25	22	23	24	25	26	27	28
29	30	31	..	..	..	..	26	27	28	29	30	31	..	29	30	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
APRIL							AUGUST							DECEMBER						
..	..	..	<b>1</b>	2	3	4	..	..	..	..	..	1	..	..	1	<b>2</b>	3	4	5	..
5	6	7	8	9	10	11	2	3	4	5	6	7	8	6	7	8	9	10	11	12
12	13	14	<b>15</b>	16	17	18	9	10	11	12	13	14	15	13	14	15	<b>16</b>	17	18	19
19	20	21	22	23	24	25	16	17	18	19	20	21	22	20	21	22	23	24	25	26
26	27	28	29	30	..	..	23	24	25	26	27	28	29	27	28	29	30	31	..	..
..	..	..	..	..	..	..	30	31	..	..	..	..	..	..	..	..	..	..	..	..
MAY							SEPTEMBER							JANUARY						
..	..	..	..	..	1	2	..	..	1	<b>2</b>	3	4	5	..	..	..	..	..	1	2
3	4	5	<b>6</b>	7	8	9	6	7	8	9	10	11	12	3	4	5	<b>6</b>	7	8	9
10	11	12	13	14	15	16	13	14	15	<b>16</b>	17	18	19	10	11	12	13	14	15	16
17	18	19	<b>20</b>	21	22	23	20	21	22	23	24	25	26	17	18	19	<b>20</b>	<b>21</b>	22	23
24	25	26	27	28	29	30	27	28	29	30	..	..	..	24	25	26	27	28	29	30
31	..	..	..	..	..	..	..	..	..	..	..	..	..	31	..	..	..	..	..	..

NOTE. Regular meetings are called to order at 8.30 P. M.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

The Annual Convention will be held at Asheville, N. C., on June 9th, 10th, 11th and 12th, 1903.



# CONSTITUTION.

ADOPTED MARCH 4TH, 1891.\*

## ARTICLE I.—NAME, LOCATION AND OBJECT.

1.—The name of this Association shall be the **AMERICAN SOCIETY OF CIVIL ENGINEERS.**

2.—The offices of the Society shall be located in the City of New York.

3.—Its objects shall be the advancement of engineering knowledge and practice and the maintenance of a high professional standard among its members.

4.—Among the means to be employed for this purpose shall be: meetings for the presentation and discussion of appropriate papers and for social and professional intercourse; the publication of such papers and discussions as may be deemed expedient; the maintenance of a library, the collection of maps, drawings and models, and the establishment of facilities for their use.

## ARTICLE II.—MEMBERSHIP.

1.—The Corporate Members of this Society shall be designated as **Members and Associate Members.** There may also be connected with the Society, **Honorary Members, Associates, Juniors and Fellows** who shall be entitled to all the privileges of the Society, except the right to vote and to hold office therein; provided that **Honorary Members** elected from the Corporate Members of the Society shall retain their right to vote and to hold office.

2.—A Member shall be a **Civil, Military, Naval, Mining, Mechanical, Electrical, or other professional Engineer, an Architect or a Marine Architect.** He shall be at the time of admission to membership not less than thirty years of age, and shall have been in the active practice of his profession for ten years; he shall have had responsible charge of work for at least five years, and shall be qualified to design as well as to direct engineering works. Graduation from a school of engineering of recognized reputation shall be considered as equivalent to two years' active practice. The performance of the duties of a Professor of Engineering in a technical school of a high grade shall be taken as an equivalent to an equal number of years of actual practice.

\*Amended October 3d, 1894; March 6th, 1895; October 6th, 1897; October 34th, 1898; and October 3d, 1900.

## CONSTITUTION.

3.—An Associate Member shall be a professional Engineer or Architect not less than twenty-five years of age, who shall have been in the active practice of his profession for at least six years, and who shall have had responsible charge of work as principal or assistant for at least one year. Graduation from a school of engineering of recognized reputation shall be considered as equivalent to two years' active practice.

4.—Any person having the necessary qualifications prescribed in this article to entitle him to admission to the grades of Member or Associate Member, shall be eligible for such membership, though he may not be practicing his profession at the time of making his application.

5.—An Associate shall be a person who, by scientific acquirements or practical experience, has attained a position in his special pursuit qualifying him to co-operate with engineers in the advancement of professional knowledge and practice, but who is not a professional engineer.

6.—A Junior shall be not less than eighteen years of age, and his connection with the Society shall cease when he becomes thirty years of age, unless he be previously transferred to another grade. He shall have had active practice in some branch of engineering for at least two years, or he shall have graduated from a school of engineering of recognized standing. He shall state in his application for membership that he intends to become or to continue to be an engineer. Persons who are in the Junior class at the time of the adoption of this Constitution shall not have their status changed by the provisions of this section.

7.—Honorary Members shall be chosen only from persons of acknowledged eminence in some branch of engineering or the sciences related thereto. There shall not be more than twenty at any one time.

8.—Fellows shall be contributors to the permanent funds of the Society, though they may not be eligible for admission as Corporate Members.

## ARTICLE III.—ADMISSIONS AND EXPULSIONS.

1.—Honorary Members shall be proposed by at least ten members, and shall be elected only by a unanimous vote of the Board of Direction. A Past-President, or a member of the Board of Direction proposed for Honorary Membership, shall not be required to vote either for or against his own admission.

A person elected an Honorary Member shall be promptly notified thereof by letter. The election shall be canceled if an acceptance is not received within six months after the mailing of such notice.

2.—An application for admission to the Society as Member or as Associate Member, or for transfer from any other grade to either grade of Corporate Membership, shall embody a concise statement, with dates, of the candidate's professional training and experience; and shall be in a form and in such detail as may be prescribed by the Board of Direction. It shall be signed by the applicant, and shall contain a promise to conform to the requirements of membership, if elected. The applicant shall furnish the names of at least five Corporate Members to whom he is personally known. Each of these shall be requested by the Secretary to address a letter to the Board of Direction, on a form prescribed by said Board, stating the extent of the writer's personal knowledge of the applicant and of his professional work. If at least five of the

## CONSTITUTION.

Corporate Members named as references do not furnish the requisite endorsement, the Secretary shall call upon the applicant for additional names, and not until written communications shall have been received from at least five Corporate Members shall the application be considered by the Board.

Applications of engineers not resident in North America, and who may be so situated as not to be personally known to five Corporate Members, may be recommended for ballot by five members of the Board of Direction, after having secured evidence sufficient, in their opinion, to show that the applicant is worthy of admission.

3.—At stated periods, to be determined by the Board of Direction, there shall be issued to each member in any grade whose address is known, a list of all new applications received for membership in any grade or for transfer from one grade to another, which list shall be dated and shall contain a concise statement of the record of each applicant and the names of the references in the case of Corporate Member, and endorsers in the case of Associate, Junior or Fellow, with a request that members transmit to the Board any information in their possession which may affect the disposition of the applications. Not less than twenty days after the issue of such list, the Board of Direction shall consider these applications, together with any information in regard to the applicants that may have been received; may make further inquiries, if deemed expedient; may classify the applicant with his consent, and on applications for Corporate Membership may direct a ballot.

4.—The ballots shall be letter-ballots, in a form to be prescribed by the Board of Direction. They shall be mailed to each Corporate Member whose address is known, and shall state the date on which the ballot is to be canvassed, which shall be not less than twenty days after the issue of the ballot. Seven or more negative votes shall exclude from election. In case of exclusion no notice thereof shall be entered on the minutes, but the candidate shall be notified.

5.—The Board of Direction, upon receipt of letters from not less than eight Corporate Members in good standing, requesting a reconsideration of the ballot on any excluded candidate, and stating the reasons for such request, shall consider these reasons, and if the Board deems them sufficient, it shall cause a notice to be mailed to each Corporate Member whose address is known, giving the name and record of the applicant, and the names of those who ask a reconsideration. This notice shall include a request that any member having information which might aid in a proper consideration of the application, will at once transmit such information to the Board of Direction.

Not less than twenty days after the issue of this notice, the Board shall again consider the request with any additional information that may have been received, and it may continue the inquiry so as to secure the fullest information. If the Board decides that the reasons for a reconsideration are sufficient, it shall order another ballot to be taken. A letter-ballot, in a form to be prescribed by the Board, shall then be mailed to each Corporate Member whose address is known. Each ballot shall be signed by the member who votes it. The returns shall be canvassed by the Board at a meeting to be held not less than twenty days after the blank ballots shall have been mailed by the Secretary.

## CONSTITUTION.

Negative votes to the number of ten per cent. of those cast shall exclude. In case of exclusion, no notice thereof shall be entered in the minutes, but the candidate shall be notified.

The request for reconsideration of a ballot must be presented within one year after the date of the original canvass of such ballot.

6.—An application for admission as Associate, Junior or Fellow shall be in a form to be prescribed by the Board of Direction; shall embody a statement of the applicant's qualifications for the grade of membership to which admission is sought and a promise to conform to its requirements. The application shall be signed by the applicant, and it shall be indorsed by at least three Corporate Members, who shall certify that they personally know the applicant, that they believe him to be in all respects a proper person to be admitted to the Society, and that they recommend him for admission.

7.—The Board of Direction, after making such inquiries as it may deem expedient, shall have the power to elect persons so proposed, as Associates, Juniors or Fellows; and shall notify the membership of its action.

8.—All elected candidates shall be duly notified and shall subscribe to the Constitution and Rules of the Society. Forms for these purposes shall be prescribed by the Board of Direction. If these provisions are not complied with within six months from the notification of election, such election shall be considered void, unless for special reason the time shall be extended by the Board of Direction.

Membership of any person shall date from the day of his election.

9.—Upon the written request of ten or more Corporate Members, that for cause therein set forth a person belonging to the Society be expelled, the Board of Direction shall consider the matter, and, if there appears to be sufficient reason, shall advise the accused of the charges against him. He may, if he so desires, present a written defense which shall be considered at a meeting of the Board of Direction, of which he shall receive due notice. Not less than two months after such meeting, the Board of Direction shall finally consider the case, and if resignation has not been tendered, or a defense made which is satisfactory to the Board, it shall then notify the person that he will be expelled in one month, unless he elects to appeal from this decision. Appeals will be submitted to the Corporate Members by letter-ballot in a form to be prescribed by the Board of Direction. The ballot shall be accompanied by a statement of the charges, and of the action of the Board thereon, with such information as it deems proper, and also the statement of the person making the appeal. The ballot shall be canvassed by the Board not less than twenty days after its issue. A majority of the ballots cast will be required to sustain the action of the Board. The Board will notify the person and the Corporate Members of the result of the ballot. In case no appeal be made, the Board of Direction will expel the person, and notify him and the Corporate Members of its action.

10.—A member of any grade in the Society may resign his membership by a written communication to the Secretary, who shall present the same to the Board of Direction; when, if all his dues have been paid, his resignation shall be accepted.

11.—All persons elected and duly qualified, whose address on the records of the Society is within fifty miles of the Post Office in the City of New



## CONSTITUTION.

York, shall be deemed Resident; and those whose address is beyond that limit shall be deemed Non-Resident.

The classification of each person for the fiscal year as Resident or Non-Resident, shall be determined by the Records of the Society as they may appear on January 1st of that year.

### ARTICLE IV.—DUES.

1.—The entrance fees payable on admission to the Society shall be as follows: by Members, thirty dollars; Associate Members, twenty-five dollars; Associates, twenty dollars; Juniors, ten dollars.

2.—The annual dues payable by members, whether Resident or Non-Resident, shall be as follows: by Corporate Members, fifteen dollars; Associates, ten dollars; Juniors, ten dollars.

3.—In addition to the dues prescribed in the preceding section, each Resident Member shall pay annually as follows: Corporate Members, ten dollars; Associates, five dollars; Juniors, five dollars.

4.—A person transferred from any grade to a higher one shall pay the difference between the entrance fees of the two grades, and his annual dues shall be those of the higher grade.

5.—The annual contributions shall become due for the ensuing year on the first day of January, and shall be payable in advance. It shall be the duty of the Secretary to notify each member of the amount due for the ensuing year at the time of giving notice of the Annual Meeting.

6.—Persons elected after six months of any fiscal year shall have expired, shall pay only one-half of the amount of dues for that fiscal year.

7.—All future annual dues may be compounded by a single payment by a Corporate Member of \$250; or by an Associate of \$150. Should a compounding Associate be elected to Corporate Membership he shall pay the further sum of \$100.

Provided, that all compounding Corporate Members or Associates who may be or hereafter become Resident, shall be and remain liable for the annual payment of the difference between the annual dues of Resident and Non-Resident Corporate Members, or Associates; but any Corporate Member may at any time compound for the future payment of all annual dues of every nature and kind by the payment of \$75 in addition to the \$250 hereinbefore named; and any Associate may at any time compound for the future payment of all annual dues as Associate by the payment of \$40 in addition to the \$150 hereinbefore named.

Provided, that any person desiring to compound for future dues shall have paid his entrance fee, all arrears of dues, and the annual dues for the current year, before the compounding sum may be available.

Persons compounding shall sign an agreement that they will be governed by the Constitution and Laws of the Society as they are now formed, or as they may be hereafter altered, amended or enlarged; and that in case of their ceasing to be connected with the Society from any cause whatever, the amount theretofore paid by them for compounding, and for entrance fees and annual dues, shall be the property of the Society.



## CONSTITUTION.

All moneys thus paid in commutation of annual dues shall be invested as a permanent fund, only the interest thereupon being subject to appropriation for current expenses.

8.—Any person whose dues are more than three months in arrears shall be notified by the Secretary. Should his dues not be paid when they become six months in arrears, he shall lose the right to vote or to receive the publications of the Society. Should his dues become nine months in arrears, he shall again be notified in form prescribed by the Board of Direction, and if such dues become one year in arrears, he shall forfeit his connection with the Society. The Board of Direction, however, may, for cause deemed by it sufficient, extend the time for payment and for the application of these penalties.

9.—The Board of Direction may, for sufficient cause, temporarily excuse from payment of annual dues any member who from ill health, advanced age, or other good reason assigned, is unable to pay such dues; and the Board may remit the whole or part of dues in arrears, or accept in lieu thereof, desirable additions to the Library, or collections.

10.—Every person admitted to the Society shall be considered as belonging thereto and liable for the payment of all dues until he shall have resigned, been expelled, or have been relieved therefrom by the Board of Direction.

11.—Persons elected as Fellows shall become such upon the payment of Two Hundred and Fifty dollars into the permanent funds of the Society. They shall not be liable for other fees and dues.

12.—The status of any present subscribers shall not be changed by the provisions of this Constitution.

## ARTICLE V.—OFFICERS.

1.—The officers of the Society shall be a President, four Vice-Presidents, eighteen Directors, a Secretary, and a Treasurer, who, with the five latest living Past-Presidents, who continue to be members, shall constitute the Board of Direction in which the government of the Society shall be vested, and who shall be the Trustees as provided for by the laws under which the Society is organized. For the election of Honorary Members, all the Past-Presidents shall be members of the Board of Direction, except any Past-President who may be disqualified by mental or bodily infirmity, and the evidence of said disqualification shall be a written certificate from his attending physician, or some officer of the Society.

2.—The terms of office of the President, Secretary and Treasurer shall be one year; of the Vice-Presidents, two years; and of the Directors, three years. Provided, however, that at the first election after the adoption of this Constitution, four Vice-Presidents and eighteen Directors shall be elected, of whom two Vice-Presidents and six Directors shall be elected to serve for one year only, and six Directors for two years only; provided, also, that after the first election two Vice-Presidents and six Directors shall be elected each year.

The term of each officer shall begin at the close of the Annual Meeting at which such officer is elected, and shall continue for the period above named or until a successor is duly elected.

3.—A vacancy in the office of President shall be filled by the senior Vice-President.

## CONSTITUTION.

A vacancy in the office of Vice-President shall be filled by the senior Director. Seniority between persons holding similar offices shall be determined by priority of election to the office, and when these dates are the same, by priority of admission to Corporate Membership; and when the latter dates are identical, the selection shall be made by lot. In case of the disability or neglect in the performance of his duty, of any officer of this Society, the Board of Direction shall have power to declare the office vacant. Vacancies in any office for the unexpired term shall be filled by the Board of Direction, except as provided above.

4.—The President shall be ineligible for re-election. The Vice-Presidents and Directors shall not be eligible for re-election to the same office until at least one full term shall have elapsed after the end of their respective terms.

5.—At least one Vice-President, the Secretary and the Treasurer, and six Directors shall be Resident Corporate Members during their term of office.

## ARTICLE VI.—MANAGEMENT.

1.—The President shall have a general supervision of the affairs of the Society. He shall preside at meetings of the Society and of the Board of Direction at which he may be present, and shall be *ex-officio* member of all committees. He shall deliver an address at the Annual Convention.

The Vice-Presidents in order of seniority shall preside at meetings in the absence of the President, and discharge his duties in case of a vacancy in the office.

2.—The Board of Direction shall manage the affairs of the Society in conformity to the laws under which the Society is organized and the provisions of this Constitution. It shall direct the investment and care of the funds of the Society; make appropriations for specific purposes; act upon applications for membership as heretofore provided; take measures to advance the interests of the Society; appoint all its employees; and generally direct its business. The Board of Direction shall make an annual report at the Annual Meeting, transmitting the report of the Treasurer and of other officers, and of Committees.

3.—The Treasurer shall receive all moneys and deposit the same in the name of the Society. He shall invest all funds not needed for current disbursements, as shall be ordered by the Board of Direction. He shall pay all bills, when certified and audited, as provided by this Constitution and by rules to be prescribed by the Board of Direction. He shall make an annual report and such other reports as may be prescribed by the Board of Direction.

The Board of Direction shall secure a satisfactory surety for the faithful performance of his duties by the Treasurer, and shall renew the same during the month of January of each year.

4.—The Secretary shall be a Corporate Member of the Society. He shall be elected annually by the Board of Direction at the meeting to be held within twenty days after the Annual meeting provided for in Section 8 of Article VI, or at an adjournment thereof, and shall hold the office for one year or until his successor is elected, provided that a majority of the whole Board of Direction shall be required to elect the Secretary; this vote to be given, if necessary, by letter.

He shall be, under the direction of the President and Board of Direction, the executive officer of the Society.

## CONSTITUTION.

He will be expected to attend all meetings of the Society and of the Board of Direction; prepare the business therefor, and duly record the proceedings thereof.

He shall see that all moneys due the Society are carefully collected, and without loss transferred to the custody of the Treasurer.

He shall carefully scrutinize all expenditures, and use his best endeavor to secure economy in the administration of the Society.

He shall personally certify the accuracy of all bills or vouchers on which money is to be paid, and shall countersign the checks drawn by the Treasurer against the funds of the Society, when such drafts are known to him to be proper and duly authorized by the Finance Committee.

He shall have charge of the books of account of the Society, and shall furnish monthly to the Board of Direction a statement of receipts and expenses under their several headings, and also a statement of monthly balances. He shall present annually, to the Board of Direction, a balance sheet of his books, as of the 31st of December, and shall furnish, from time to time, such other statements as may be required of him.

He shall conduct the correspondence of the Society and keep full records of the same.

He shall have charge of the Society's house and its contents; shall supervise the work of all employees of the Society, and see that they diligently perform their respective duties.

He shall perform all other duties which may from time to time be assigned to him by the Board of Direction.

5.—The Board of Direction may also, if they deem it necessary, appoint an Assistant Secretary, who shall aid the Secretary and be under his immediate direction in all matters. His whole time shall be given to the Society.

6.—The Secretary and Treasurer shall be paid salaries to be determined by the Board of Direction; but such salaries shall not be reduced during the term of office, as provided in this Constitution. All other salaries shall be fixed, from time to time, by the Board of Direction.

7.—The Board of Direction shall meet within twenty days after the Annual Meeting, and shall then appoint from its members a Finance Committee of five, a Library Committee of five, and a Committee on Publications of five. At least three members of the Finance Committee, and two members of the other Committees, shall be resident within fifty miles of New York.

These Committees shall report to the Board of Direction, and perform their duties under its supervision.

8.—The Finance Committee shall have immediate supervision of the financial affairs of the Society; shall employ an expert accountant to audit the accounts monthly; shall approve all bills before payment, and shall make recommendations to the Board of Direction as to the investment of moneys, and as to other financial matters.

9.—The Library Committee shall have general supervision of the Library and the House of the Society and the property therein; shall make recommendations to the Board with reference thereto, and shall direct the expenditure for books and other articles of permanent value, of such sums as may be appropriated for these purposes.

## CONSTITUTION.

10.—The Committee on Publications shall have general supervision of the publications of the Society, and of contracts and expenditures connected therewith.

11.—In the consideration of papers offered for presentation, those papers containing matter readily found elsewhere, those specially advocating personal interests, those carelessly prepared or controverting established facts, and those purely speculative or foreign to the purposes of the Society, shall be rejected. The Committee on Publications shall determine which papers shall be read in full, and which shall be printed after reading by title only. The Committee may return a paper to the writer for correction and amendment, and call to its aid one or more members of special experience relating to the subject treated, either to advise on the paper or to discuss it. Such papers as in the judgment of the Committee should appear in the *Transactions*, shall promptly, upon their acceptance, be printed and distributed to members of all grades; others shall, with the consent of the authors, be suitably indexed, and filed for reference, or the Committee may provide abstracts thereof, which, when approved by the authors, may be published instead of the original papers. Advance copies of papers and discussions may be sent out to the membership before final publication.

12.—Special committees to report upon engineering subjects shall be authorized only by a majority of the votes cast by the Society, and in the following manner: A proposition to appoint such a Committee shall be presented at a regular meeting of the Society, and if sustained, on a motion to refer the same to the Board of Direction, by an affirmative vote of not less than twenty-five Corporate Members, it shall be so referred.

The Board of Direction shall then consider the same and report its recommendations to the Society at the next general business meeting, together with a statement of the arguments for and against the appointment of such Committee.

If a motion for the issue of a letter-ballot thereon receive the affirmative vote of two-thirds of the Corporate Members present, the Board of Direction shall, within thirty days thereafter, issue the letter-ballot, accompanied by a statement of the arguments for and against the proposition.

A majority of a total vote of not less than one-third of the Corporate Membership of the Society shall be necessary for its adoption, whereupon the Committee so authorized shall be appointed by the Board of Direction.

## ARTICLE VII.—NOMINATION AND ELECTION OF OFFICERS.

1.—The Board of Direction shall, from time to time, divide the territory occupied by the membership into seven geographical districts, to be designated by numbers. District No. 1 shall be the territory within fifty miles of the Post Office in the City of New York. Each of the other six districts shall be, as nearly as practicable, contiguous territory; each shall contain, as nearly as practicable, an equal number of members, and they shall be designated as Districts Nos. 2, 3, 4, 5, 6 and 7. The Board shall announce such division to the Society on or before the first day of May in each year.

2.—At the Annual Meeting of each year, seven Corporate Members, not officers of the Society, one from each of the geographical districts, shall be appointed by the meeting to serve for two years; who, with the five living last



## CONSTITUTION.

Past-Presidents of the Society, shall be a committee to nominate officers for the Society.

The Board of Direction may prescribe the mode of procedure for appointing this Committee.

The Committee so appointed shall meet at the Annual Convention of the Society, and nominate candidates to fill the offices, named in Article V, so as to provide, with the officers holding over, a Vice-President and six Directors residing in District No. 1, and twelve Directors divided equally, with regard to number and residence, among the remaining districts, Nos. 2, 3, 4, 5, 6 and 7.

A list of nominees for the offices to be filled at the next Annual Election shall be presented by the Committee to the Board of Direction within ten days after the nominees have been selected.

3.—Directly after the first of October the aforesaid list of nominees shall be mailed to every Corporate Member whose address is known, provided that if any person shall be found by the Board of Direction to be ineligible for the office for which he is nominated, or should a nominee decline such nomination, his name shall not be sent out, but the Board shall substitute another name therefor. The Board shall also fill any vacancies that may occur in this list of nominees up to the time the ballots are sent out. Vacancies must be so filled as to preserve the geographical distribution of officers prescribed in Section 2 of this article.

4.—At any time before the first day of December, any ten or more Corporate Members may send to the Secretary additional nominations, signed by such members; but nominations so made must comply with Section 2 of this article, regarding the distribution of nominees among the several districts.

5.—At least thirty days before the Annual Meeting, there shall be mailed to every Corporate Member whose address is known a letter-ballot with envelopes for voting. This ballot shall include all the nominations made in accordance with this article. The names and residences of the nominees, their grades of membership, and, in the case of nominees for Directors, the number of the district in which they reside, shall be given. The names of the nominees for any one office shall be arranged alphabetically without distinguishing marks of any kind other than the designations named herein.

Voters may erase names from the printed ballot-list and may substitute the name or names of any other person or persons eligible for any office. But the number of names for each office on the ballot voted must not exceed the number to be elected at that time to such office, and the vote must be for the proper number of officers resident in each of the seven districts. Ballots not complying with these provisions shall be rejected.

Directions in accordance with these provisions shall be issued with the ballots.

6.—Ballots may be sent by mail to the Secretary, or may be presented to him at the Society House. They must be enclosed in two sealed envelopes, and the outer envelope shall be endorsed by the voter's signature.

The Secretary shall make from the signatures on the outer envelopes a list of the voters from whom ballots are received, which list shall be open to inspection by all Corporate Members. A voter may withdraw his ballot, and may substitute another, at any time before the polls close.



## CONSTITUTION.

7.—The polls shall be closed at 12 o'clock noon on the first day of the Annual Meeting, and the ballots shall be canvassed publicly by tellers, who shall be appointed by the presiding officer.

The persons of each district who shall receive the highest number of votes for the office for which they are candidates shall be declared elected.

In case of a tie between two or more candidates for the same office, the Annual Meeting shall elect the officer from among the candidates so tied.

The presiding officer shall announce to the meeting the names of the officers elected, in accordance with this section.

### ARTICLE VIII. — MEETINGS.

1.—A Convention of the Society for the reading and discussion of professional papers and for social intercourse shall be held annually at such time and place as the Society may determine.

2.—There shall be two general Business Meetings of the Society each year: the Annual Meeting, which shall be held at the offices of the Society on the third Wednesday in January, and at which the annual reports for the year ending December 31st previous shall be presented, and the ballot for officers canvassed; and a Business Meeting during the Annual Convention, which shall be held at a time and place to be determined by the Board of Direction.

At these meetings thirty Corporate Members shall constitute a quorum.

3.—Business Meetings shall be held monthly on the first Wednesday of each month, except during the months of July and August. At these meetings thirty Corporate Members shall constitute a quorum.

4.—In addition to the Annual Meeting and the Annual Convention, meetings for the reading and discussion of papers shall be held as ordered by the Board of Direction.

5.—Special meetings may be called by the Board of Direction, and shall be so called on the request of thirty Corporate Members, which request shall state the purpose of such meeting. The call for such meetings shall be issued ten days in advance, and shall state the purpose thereof, and no other business shall be taken up at such meeting. At these meetings thirty Corporate Members shall constitute a quorum.

6.—The Society may adopt, from time to time, rules for the order of business at its meetings.

7.—Meetings of the Board of Direction shall be held at the time of the Annual Meeting and of the Annual Convention, at which meeting nine members shall constitute a quorum; and at such other times as the Board may determine, at which five members shall constitute a quorum.

### ARTICLE IX.—AMENDMENTS.

1.—Proposed amendments to this Constitution must be reduced to writing and signed by not less than five Corporate Members, and be submitted and acted upon as follows:

2.—Amendments presented to the Secretary on or before the first Wednesday in November shall be sent by letter to the several Corporate Members of the Society at least twenty-five days previous to the Annual Meeting. Such amendments shall be in order for discussion at such Annual Meeting, and may be

## CONSTITUTION.

amended in any manner pertinent to the original amendments by a majority vote of the Annual Meeting, and if so amended shall be voted upon by letter-ballot in form as amended by the Annual Meeting; if not so amended, they shall be voted upon by letter-ballot as submitted. The vote to be counted at the first regular meeting in March.

3.—Amendments presented to the Secretary not less than sixty days previous to the date of the Annual Convention shall be sent by letter to the several Corporate Members of the Society at least twenty-five days previous to the Annual Convention. Said amendments shall be in order for discussion at the Business Meeting during such Annual Convention, and may be amended in any manner pertinent to the original amendments by a majority vote of the Business Meeting during the Annual Convention, and, if so amended, shall be voted upon by letter-ballot in form as amended by said Business Meeting; if not so amended, they shall be voted upon by letter-ballot as submitted. The vote to be counted at the first regular meeting in October.

4.—If, after discussion of a proposed amendment, at either of the general meetings of the Society, the meeting shall so decide by a majority vote, it may refer the amendment to a Committee for further consideration, which Committee shall report at the next general meeting, whereupon the amendment shall be voted upon as hereinbefore provided.

5.—An affirmative vote of two-thirds of all ballots cast shall be necessary to the adoption of any amendment.

Amendments so adopted shall take effect thirty days after their adoption, provided that the officers of the Society, at the time any amendment may be adopted, shall continue in office until the next Annual Election.

## GENERAL INFORMATION.

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MEETINGS.—Regular meetings are held at the House of the Society, No. 220 West Fifty-seventh Street, New York, on the first and third Wednesdays of each month, at 8.30 P. M., except during the summer. The Annual Meeting is held on the third Wednesday in January. A Convention is held annually, at a time and place determined each year by the Society.

The House and Library of the Society are open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

PUBLICATIONS.—The Society issues two publications, *Proceedings* and *Transactions*, which are furnished without extra charge to members of every grade. Subscription price per annum is for *Proceedings*, \$6; for *Transactions*, \$10. Discount to libraries, book dealers, etc., 25 per cent.

Ten numbers of *Proceedings* are issued during the year, the numbers appearing on the fourth Wednesday of each month except June and July. Each number contains minutes of meetings, announcements of matters of current interest, a classified list of current engineering articles, and a list of new books received in the Library. Papers to be subsequently presented, as well as discussions to which they give rise, are also published in *Proceedings*.

The papers with complete discussions are subsequently republished in the volumes of *Transactions*, which for some years have been issued semi-annually. Each volume contains about 600 pages, and is bound in paper covers; arrangements have also been made for furnishing these volumes bound in standard cloth (50 cents), or half morocco (\$1.00), to members or subscribers who desire to pay for them in that form.

PROFESSIONAL PAPERS.—Papers and discussions on subjects of engineering interest are invited by the Board of Direction from all persons, whether members of the Society or not, subject to proper editorial supervision. Under the Constitution, matter which may be readily found elsewhere, advocates personal interests, is carelessly prepared, controverts established facts, or is purely speculative or foreign to the purposes of the Society must be excluded.

All papers, on their acceptance by the Committee on Publications, become the property of the Society.

## GENERAL INFORMATION.

**ADDITIONS TO LIBRARY.**—It is desirable that copies of books on engineering subjects, and of reports of municipal, railway, canal, water supply and all other public works, be added to the Library. Members of the Society and all who feel an interest in the proper maintenance of a technical reference library, are asked to donate engineering books or reports.

**ADMISSION TO MEMBERSHIP.**—The requirements for each of the grades of membership may be found on pages 5 and 6.

For blank forms and other information, address the Secretary, at the Society House.

FEES AND DUES.	RESIDENT.				NON-RESIDENT.			
	Members.	Associate Members.	Associates.	Juniors.	Members.	Associate Members.	Associates.	Juniors.
Entrance Fee .....	\$30.00	\$25.00	\$20.00	\$10.00	\$30.00	\$25.00	\$20.00	\$10.00
Yearly Assessment .....	25.00	25.00	15.00	15.00	15.00	15.00	10.00	10.00
Total, payable upon Election.....	\$55.00	\$50.00	\$35.00	\$25.00	\$45.00	\$40.00	\$30.00	\$20.00

Fellowship fee, \$250 in one payment for life.

Annual dues are payable in advance on the 1st day of January.

Members elected during the last half of the year pay only one-half of the amount of dues for that year.

**COMPOUNDING DUES.**—The annual dues of a Corporate Member may be compounded by a single payment of \$250; of an Associate by a payment of \$150. Should a compounding Associate be elected to Corporate Membership, an additional payment of \$100 is necessary.

All compounding Corporate Members or Associates, who may be or hereafter become Resident, remain liable for the annual payment of the difference between the annual dues of Resident and Non-Resident Corporate Members or Associates; but any Corporate Member may at any time compound for the future payment of all annual dues of every nature and kind by the payment of \$75 in addition to the \$250 hereinbefore named; and any Associate may at any time compound for the future payment of all annual dues as Associate by the payment of \$40 in addition to the \$150 hereinbefore named.

Any person compounding his dues must have paid his entrance fee, all arrears of dues, and the annual dues for the current year, before the compounding sum can be accepted.

Persons compounding shall sign an agreement that they will be governed by the Constitution and Laws of the Society as they are now formed, or as they may be hereafter altered, amended or enlarged; and that in case of their ceasing to be connected with the Society from any cause whatever, the amount theretofore paid by them for compounding, and for entrance fees and annual dues, shall be the property of the Society.

## GENERAL INFORMATION.

**CERTIFICATES OF MEMBERSHIP.**—The prices, to cover cost of Certificates, are as follows :

Parchment.....	\$2.25
Parchment Paper.....	1.25
Plate Paper.....	1.25

Certificates are not issued to Juniors.

**BADGE.**—This is of gold and enameled, with the member's name and membership number engraved on the back, and is mounted either as an ordinary pin, a scarf pin, a watch charm, or a button. The price is \$6 for either of the first three or \$6.50 for the button. Badges can be secured only upon application to the Secretary. They are not issued to Juniors.

**REMITTANCES.**—All remittances should be made payable to the order of the American Society of Civil Engineers. They should be in drafts on New York, in Postal Money Orders payable at the New York Post-Office (not at a branch office), or Express Money Orders.



## GEOGRAPHICAL SUBDIVISIONS.

### THE SEVEN GEOGRAPHICAL DISTRICTS INTO WHICH THE TERRITORY OCCUPIED BY THE MEMBERSHIP IS DIVIDED, UNDER ART. VII, SEC. I, OF THE CONSTITUTION.

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*District No. 1.*—The territory within 50 miles of the Post-Office in the City of New York.

*District No. 2.*—The States of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut (except as included in District No. 1), and all countries in Europe.

*District No. 3.*—The States of New York and New Jersey (except as included in District No. 1), and the Dominion of Canada.

*District No. 4.*—The States of Pennsylvania, Delaware and Maryland and the District of Columbia.

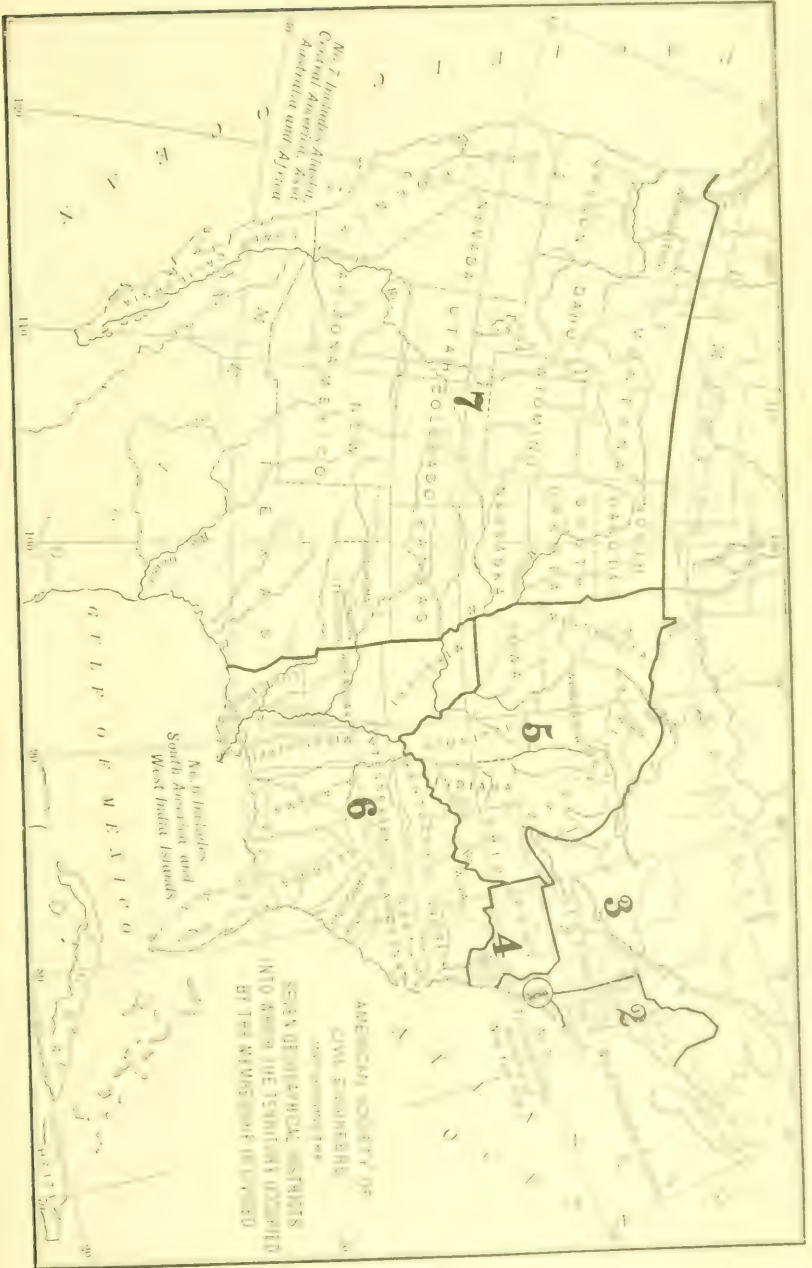
*District No. 5.*—The States of Ohio, Indiana, Illinois, Michigan, Wisconsin, Iowa and Minnesota.

*District No. 6.*—The States of Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Missouri, Arkansas and Louisiana, the West India Islands, and all countries in South America.

*District No. 7.*—The States of North Dakota, South Dakota, Nebraska, Kansas, Texas, Montana, Wyoming, Colorado, Idaho, Utah, Washington, Oregon, California and Nevada; the following territories: Indian Territory, Oklahoma, New Mexico, Arizona and Alaska; the Republic of Mexico, and all countries in Central America, Asia, Australasia and Africa.

These Districts are shown on the map on the opposite page.

# GEOGRAPHICAL SUBDIVISIONS.



## MEDALS AND PRIZES.

### RULES GOVERNING THE AWARD OF THE NORMAN MEDAL, THE THOMAS FITCH ROWLAND PRIZE AND THE COLLINGWOOD PRIZE.

#### PRIZES.

There are at present three endowed prizes for papers published in the *Transactions* of the American Society of Civil Engineers. These prizes are awarded annually.

With the assent and the approval of the donors, by action of the Board of Direction, June 1st, 1897, the Society assumes the responsibility for the payment in perpetuity of the Norman Medal, Thomas Fitch Rowland Prize and Collingwood Prize.

#### COMMITTEE ON PRIZES.

1. The Board of Direction shall appoint annually, not later than its regular meeting in June of each year, three Corporate Members of the Society, not members of the Board of Direction, who shall form a Committee to recommend the award of all prizes during the year.

2. The papers considered shall include all papers published in the *Transactions* during the year ending with the month of July.

3. The Committee on Prizes shall report its recommendation to the Board of Direction on or before December 31st, and the awards shall be made by the Board of Direction.

4. The announcement of the awards shall be made at the Annual Meeting.

5. The Secretary of the Society shall act as Secretary to the Committee on Prizes, but shall have no vote or voice in its deliberations.

#### CODE OF RULES.

*The Norman Medal.*—The Norman Medal was instituted and endowed in 1874 by the late George H. Norman, M. Am. Soc. C. E.

I. Competition for the Norman Medal of the American Society of Civil Engineers shall be restricted to members of the Society.

II. There shall be one gold medal awarded as hereinafter provided. The medal shall be deposited with the Superintendent of the United States Mint at Philadelphia, in trust exclusively for the above purpose. Such medal shall be of a value of \$60.

## MEDALS AND PRIZES.

III. All original papers presented to the Society by members of any class, and published in the *Transactions* during the year for which the medal is awarded, shall be open to the award, provided that such papers shall not have been previously contributed in whole or in part to any other association, nor have appeared in print prior to their publication by the Society, nor have been published in the *Transactions* in any previous year.

IV. The medal shall be awarded to a paper which shall be judged worthy of special commendation for its merit as a contribution to engineering science.

*The Thomas Fitch Rowland Prize.*—The Thomas Fitch Rowland Prize was originally instituted by the Society at the Annual Meeting of 1882. It was endowed in 1884 by Thomas Fitch Rowland, Hon. M. Am. Soc. C. E. Its award is not restricted to members of the Society.

I. The prize shall consist of \$60 in cash, with an engraved certificate signed by the President and Secretary of the Society.

II. In the award of this prize preference shall be given to papers describing in detail accomplished works of construction, their cost and errors in design and execution.

*The Collingwood Prize for Juniors.*—The Collingwood Prize for Juniors was instituted and endowed in 1894 by Francis Collingwood, M. Am. Soc. C. E.

I. The competition for the prize shall be restricted to the Juniors of the Society.

II. The prize shall consist of \$50 in cash, with an engraved certificate, signed by the President and the Secretary of the Society.

III. The prize shall be awarded to a paper describing an engineering work with which the writer has been directly connected, or it shall record investigations contributing to engineering knowledge, some essential part of which was made by the writer, and contain a rational digest of results. Any mathematical treatment must show immediate adaptability to professional practice. Accuracy of language and excellence of style will be factors in the award.

IV. These rules may be modified by the Board of Direction.

The awards of the Norman Medal, the Thomas Fitch Rowland Prize, and the Collingwood Prize are indicated in the List of Members by the letters N., R. and C., respectively, prefixed to the name of each recipient.

## MEDALS AND PRIZES.

### AWARDS OF THE NORMAN MEDAL.

1874. J. JAMES R. CROES, for paper "Memoir of the Construction of a Masonry Dam." Vol. III,\* p. 337.
1875. THEODORE G. ELLIS, for paper "Description and Results of Hydraulic Experiments with Large Apertures, at Holyoke, Mass., in 1874." Vol. V,\* p. 19.
1877. WILLIAM W. MACLAY, for paper "Notes and Experiments on the Use and Testing of Portland Cement." Vol. VI,\* p. 311.  
Book Prize awarded to JULIUS H. STRIEDINGER, for paper "On Igniting Blasts by Means of Electricity." Vol. VII,\* p. 1.
1879. EDWARD P. NORTH, for paper "The Construction and Maintenance of Roads." Vol. VIII,\* p. 95.  
Book Prize awarded to MAX E. SCHMIDT, for paper "Notes on the South Pass Jetties." Vol. VIII,\* p. 189.
1880. THEODORE COOPER, for paper "The Use of Steel for Bridges." Vol. VIII,\* p. 263.
1881. L. L. BUCK, for paper "The Re-Enforcement of the Anchorage and Renewal of the Suspended Superstructure of the Niagara Railroad Suspension Bridge." Vol. X,\* p. 195.
1882. A. FTELEY and F. P. STEARNS, for paper "Description of Some Experiments on the Flow of Water Made during the Construction of Works for Conveying the Water of Sudbury River to Boston." Vol. XII,\* p. 1.
1883. WILLIAM P. SHINN, for papers "On the Increased Efficiency of Railways for the Transportation of Freight." Vol. XI,\* p. 365; and "How can Railways be made more Efficient in the Transportation of Freight?" Vol. XII,\* p. 189.
1884. JAMES CHRISTIE, for paper "Experiments on the Strength of Wrought-Iron Struts." Vol. XIII,\* p. 85.
1887. ELIOT C. CLARKE, for paper "Record of Tests of Cement Made for Boston Main Drainage Works." Vol. XIV,\* p. 141.
1886. EDWARD BATES DORSEY, for paper "English and American Railroads Compared." Vol. XV,\* p. 1.
1887. DESMOND FITZGERALD, for paper "Evaporation." Vol. XV,\* p. 581.
1888. E. E. RUSSELL TRATMAN, for paper "English Railroad Track." Vol. XVIII,\* p. 217.
1889. THEODORE COOPER, for paper "American Railroad Bridges." Vol. XXI,\* p. 1.
1890. JOHN R. FREEMAN, for paper "Experiments Relating to the Hydraulics of Fire Streams." Vol. XXI,\* p. 303.
1891. JOHN R. FREEMAN, for paper "The Nozzle as an Accurate Water Meter." Vol. XXIV,\* p. 492.
1892. WILLIAM STARLING, for paper "Some Notes on the Holland Dikes." Vol. XXVI,\* p. 559.
1893. DESMOND FITZGERALD, for paper "Rainfall, Flow of Streams, and Storage." Vol. XXVII,\* p. 253.
1894. ALFRED E. HUNT, for paper "A Proposed Method of Testing Structural Steel." Vol. XXX,\* p. 181.
1895. WILLIAM HAM. HALL, for paper "The Santa Ana Canal of the Bear Valley Irrigation Company." Vol. XXXIII,\* p. 61.
1896. JOHN E. GREINER, for paper "What is the Life of an Iron Railroad Bridge?" Vol. XXXIV,\* p. 294.
1897. JULIUS BAUER, for paper "Wind Pressures in the St. Louis Tornado, with Special Reference to the Necessity of Wind Bracing for High Buildings." Vol. XXXVII,\* p. 221.
1898. B. F. THOMAS, for paper "Movable Dams." Vol. XXXIX,\* p. 431.
1899. E. HERBERT STONE, for paper "The Determination of the Safe Working Stress for Railway Bridges of Wrought Iron and Steel." Vol. XLI,\* p. 467.
1900. JAMES A. SEDDON, for paper "River Hydraulics." Vol. XLIII,\* p. 179.
1902. GARDNER S. WILLIAMS CLARENCE W. HUBBELL and GEORGE H. FENKELL, for paper "Experiments at Detroit, Mich., on the effect of Curvature upon the Flow of Water in Pipes." Vol. XLVII,\* p. 1.

\* Transactions, Am. Soc. C. E.



## MEDALS AND PRIZES.

### AWARDS OF THE THOMAS FITCH ROWLAND PRIZE.\*

1883. G. LINDENTHAL, for paper "Rebuilding the Monongahela Bridge at Pittsburgh, Pa." Vol. XII,† p. 353.
1884. HAMILTON SMITH, JR., for paper "Water Power with High Pressures and Wrought-Iron Water Pipe." Vol. XIII,† p. 15.
1885. A. M. WELLINGTON, for paper "Experiments with New Apparatus on Journal Friction at Low Velocities." Vol. XIII,† p. 409.
1886. CHARLES C. SCHNEIDER, for paper "The Cantilever Bridge at Niagara Falls." Vol. XIV,† p. 499.
1887. WILLIAM METCALF, for paper "Steel: Its Properties; Its Use in Structures and in Heavy Guns." Vol. XVI,† p. 283.
1888. CLEMENS HIRSCHKE, for paper "The Venturi Water Meter: An Instrument Making Use of a New Method of Gauging Water; Applicable to the Cases of Very Large Tubes, and of a Small Value Only, of the Liquid to be Gauged." Vol. XVII,† p. 228.
1889. JAMES D. SCHUYLER, for paper "The Construction of the Sweetwater Dam." Vol. XIX,† p. 201.
1890. O. CHANUTE, JOHN F. WALLACE and WILLIAM H. BREITHAUP, for paper "The Sibley Bridge." Vol. XXI,† p. 97.
1891. WILLIAM H. BURE, for paper "The River Spans of the Cincinnati and Covington Elevated Railway, Transfer and Bridge Company." Vol. XXIII,† p. 47.
1892. SAMUEL M. ROWE, STILLMAN W. ROBINSON and HENRY H. QUIMBY, for paper "Red Rock Cantilever Bridge." Vol. XXV,† p. 662.
1893. WILLIAM MURRAY BLACK, for paper "The Improvement of Harbors on the South Atlantic Coast of the United States." Vol. XXIX,† p. 223.
1894. DAVID L. BARNES, for paper "Distinctive Features and Advantages of American Locomotive Practice." Vol. XXIX,† p. 385.
1895. WILLIAM R. HILL, for paper "The Water-Works of Syracuse, N. Y." Vol. XXXIV,† p. 23.
1896. H. ST. L. COTÉE, for paper "Bank Revetment on the Lower Mississippi." Vol. XXXV,† p. 141.
1897. ARTHUR L. ADAMS, for paper "The Astoria (Oregon) City Water-Works." Vol. XXXVI,† p. 1.
1898. HENRY GOLDMARK, for paper "The Power Plant, Pipe Line and Dam of the Pioneer Electric Power Company at Ogden, Utah." Vol. XXXVIII,† p. 246.
1899. R. S. BUCK, for paper "The Niagara Railway Arch." Vol. XL,† p. 125.
1900. ALLEN HAZEN, for paper "The Albany Water Filtration Plant." Vol. XLIII,† p. 244.
1901. L. G. MONTONY, for paper "The Ninety-Sixth Street Power Station of the Metropolitan Street Railway Company, of New York City." Vol. XLIV,† p. 119.
1902. WILLIAM W. HARTS, for paper "Description of Coos Bay, Oregon, and the Improvement of Its Entrance by the Government." Vol. XLVI,† p. 482.

### AWARDS OF THE COLLINGWOOD PRIZE FOR JUNIORS.

1895. MORTON L. BYERS, for paper "The Renewal of the Channel Pier of the Cincinnati and Muskingum Valley Railway Bridge over the Scioto River." Vol. XXXI,† p. 361.
1896. HERBERT WALDO YORK, for paper "The Twenty-Eighth Street Central Station of the United Electric Light and Power Company." Vol. XXXV,† p. 429.
1899. JULIUS KARN, for paper "The Coal Hoists of the Calumet and Hecla Mining Company." Vol. XLI,† p. 269.
1900. ROBERT P. WOODS, for paper "Street Grades and Cross-Sections in Asphalt and Cement." Vol. XLII,† p. 1.
1901. F. A. KUMMER, for paper "A Proposed Method for the Preservation of Timber." Vol. XLV,† p. 181.

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\* This prize was known as the Rowland Prize from 1883 to 1886 and consisted of \$50. Beginning with the award for 1891 it is to be known as the Thomas Fitch Rowland Prize and consists of \$50, with an engraved certificate signed by the President and Secretary of the Society.

† *Transactions*, Am. Soc. C. E.

# CONVENTIONS.

## LOCATION AND DATE OF ANNUAL CONVENTIONS.

Number.	Location.	Date.
<i>First,</i>	New York, N. Y.,	June, 1869
<i>Second,</i>	New York, N. Y.,	June, 1870
<i>Third,</i>	New York, N. Y.,	June, 1871
<i>Fourth,</i>	Chicago, Ill.,	June, 1872
<i>Fifth,</i>	Louisville, Ky.,	May, 1873
<i>Sixth,</i>	New York, N. Y.,	June, 1874
<i>Seventh,</i>	Pittsburg, Pa.,	June, 1875
<i>Eighth,</i>	Philadelphia, Pa.,	June, 1876
<i>Ninth,</i>	New Orleans, La.,	April, 1877
<i>Tenth,</i>	Boston, Mass.,	June, 1878
<i>Eleventh,</i>	Cleveland, Ohio,	June, 1879
<i>Twelfth,</i>	St. Louis, Mo.,	May, 1880
<i>Thirteenth,</i>	Montreal, Que., Canada,	June, 1881
<i>Fourteenth,</i>	Washington, D. C.,	May, 1882
<i>Fifteenth,</i>	St. Paul and Minneapolis, Minn.,	June, 1883
<i>Sixteenth,</i>	Buffalo, N. Y.,	June, 1884
<i>Seventeenth,</i>	Deer Park, Md.,	June, 1885
<i>Eighteenth,</i>	Denver, Colo.,	July, 1886
<i>Nineteenth,</i>	Hotel Kaaterskill, N. Y.,	July, 1887
<i>Twentieth,</i>	Milwaukee, Wis.,	June, 1888
<i>Twenty-first,</i>	Seabright, N. J.,	June, 1889
<i>Twenty-second,</i>	Cresson, Pa.,	June, 1890
<i>Twenty-third,</i>	Lookout Mountain, Tenn.,	May, 1891
<i>Twenty-fourth,</i>	Old Point Comfort, Va.,	June, 1892
<i>Twenty-fifth,</i>	Chicago, Ill.,	July, 1893
<i>Twenty-sixth,</i>	Niagara Falls, N. Y.,	June, 1894
<i>Twenty-seventh,</i>	Hotel Pemberton, Hull, Mass.,	June, 1895
<i>Twenty-eighth,</i>	San Francisco, Cal.,	June, 1896
<i>Twenty-ninth,</i>	Quebec, Que., Canada,	June, 1897
<i>Thirtieth,</i>	Detroit, Mich.,	July, 1898
<i>Thirty-first,</i>	Cape May, N. J.,	June, 1899
<i>Thirty-second,</i>	London, England,	July, 1900
<i>Thirty-third,</i>	Niagara Falls, N. Y.,	June, 1901
<i>Thirty-fourth,</i>	Washington, D. C.,	May, 1902

# LIST OF MEMBERS.

## AUTHORIZED ABBREVIATIONS.

HONORARY MEMBER	=	=	Hon. M. Am. Soc. C. E.
MEMBER	=	=	M. Am. Soc. C. E.
ASSOCIATE MEMBER	=	=	Assoc. M. Am. Soc. C. E.
ASSOCIATE	=	=	Assoc. Am. Soc. C. E.
JUNIOR	=	=	Jun. Am. Soc. C. E.
FELLOW	=	=	F. Am. Soc. C. E.

The Board of Direction requests the use of these  
abbreviations in all cases.

The awards of the Norman Medal, the Thomas Fitch Rowland Prize,  
and the Collingwood Prize, are indicated in this list by the letters N., R.  
and C., respectively, prefixed to the name of each recipient.

It is particularly requested that every  
change of address  
be communicated immediately to:  
The Secretary, American Society of Civil Engineers,  
220 West Fifty-seventh Street,  
New York, N. Y.

## PAST-PRESIDENTS.

<i>James Laurie</i> .....	Nov. 5, 1852, to Nov. 6, 1867.
<i>James Pugh Kirkwood</i> .....	Nov. 6, 1867, to Aug. 5, 1868.
<i>William Jarvis McAlpine</i> .....	Aug. 5, 1868, to Nov. 3, 1869.
<i>Alfred Wingate Craven</i> .....	Nov. 3, 1869, to Nov. 1, 1871.
<i>Horatio Allen</i> .....	Nov. 1, 1871, to Nov. 5, 1873.
<i>Julius Walker Adams</i> .....	Nov. 5, 1873, to Nov. 3, 1875.
<i>George Sears Greene</i> .....	Nov. 3, 1875, to Nov. 7, 1877.
<i>Ellis Sylvester Chesbrough</i> .....	Nov. 7, 1877, to Nov. 6, 1878.
<i>William Milnor Roberts</i> .....	Nov. 6, 1878, to Nov. 5, 1879.
<i>Albert Fink</i> .....	Nov. 5, 1879, to Nov. 3, 1880.
<i>James Bicheno Francis</i> .....	Nov. 3, 1880, to Jan. 18, 1882.
<i>Ashbel Welch</i> .....	Jan. 18, 1882, to Sept. 25, 1882.*
CHARLES PAINE.....	Jan. 17, 1883, to Jan. 16, 1884.
DON JUAN WHITTEMORE.....	Jan. 16, 1884, to Jan. 21, 1885.
<i>Frederic Graff</i> .....	Jan. 21, 1885, to Jan. 20, 1886.
<i>Henry Flad</i> .....	Jan. 20, 1886, to Jan. 19, 1887.
<i>William Ezra Worthen</i> .....	Jan. 19, 1887, to Jan. 18, 1888.
THOMAS COLTRIN KEEFER.....	Jan. 18, 1888, to Jan. 16, 1889.
<i>Max Joseph Becker</i> .....	Jan. 16, 1889, to Jan. 15, 1890.
<i>William Powell Shinn</i> .....	Jan. 15, 1890, to Jan. 21, 1891.
OCTAVE CHANUTE.....	Jan. 21, 1891, to Jan. 20, 1892.
MENDES COHEN.....	Jan. 20, 1892, to Jan. 18, 1893.
WILLIAM METCALF.....	Jan. 18, 1893, to Jan. 17, 1894.
WILLIAM PRICE CRAIGHILL.....	Jan. 17, 1894, to Jan. 16, 1895.
GEORGE SHATTUCK MORISON.....	Jan. 16, 1895, to Jan. 15, 1896.
<i>Thomas Curtis Clarke</i> .....	Jan. 15, 1896, to Jan. 20, 1897.
BENJAMIN MORGAN HARROD.....	Jan. 20, 1897, to Jan. 19, 1898.
ALPHONSE FTELEY.....	Jan. 19, 1898, to Jan. 18, 1899.
DESMOND FITZGERALD.....	Jan. 18, 1899, to Jan. 17, 1900.
JOHN FINDLEY WALLACE.....	Jan. 17, 1900, to Jan. 16, 1901.
JOHN JAMES ROBERTSON CROES.....	Jan. 16, 1901, to Jan. 15, 1902.
ROBERT MOORE.....	Jan. 15, 1902, to Jan. 21, 1903.

In this list, the names of deceased Past-Presidents are printed in italics.

\* Mr. Ashbel Welch died September 25, 1882, during his term of office as President.

## OFFICERS, 1903.

### PRESIDENT

ALFRED NOBLE.

### VICE-PRESIDENTS

*Term expires January, 1904.*

CHARLES C. SCHNEIDER, JOHN R. FREEMAN,

*Term expires January, 1905*

L. F. G. BOUSCAREN, JAMES D. SCHUYLER.

### SECRETARY

CHARLES WARREN HUNT.

### TREASURER

JOSEPH M. KNAP.

### DIRECTORS

*Term expires January, 1904*

JOSIAH A. BRIGGS, GEORGE F. SWAIN, EMIL KUICHLING, MORDECAI T. ENDICOTT,  
EDWARD C. CARTER, FRANK C. OSBORN.

*Term expires January, 1905*

RICHARD S. BUCK, GEORGE H. PEGRAM, WILLIAM J. WILGUS, WILLIAM JACKSON,  
EDMUND F. VAN HOESEN, JAMES L. FRAZIER.

*Term expires January, 1906*

ALFRED CRAVEN, JOSEPH O. OSGOOD, GEORGE S. DAVISON, E. C. LEWIS,  
HUNTER McDONALD, ELWOOD MEAD.

### PAST-PRESIDENTS

*Members of the Board*

ALPHONSE FTELEY, DESMOND FITZGERALD, JOHN F. WALLACE,  
J. JAMES R. CROES, ROBERT MOORE.

### ASSISTANT SECRETARY

THOMAS J. McMINN.



# Standing Committees of the Board of Direction.

The President is *ex officio* a member of all committees.

## *On Finance :*

L. F. G. BOUSCAREN,	JOSIAH A. BRIGGS,	RICHARD S. BUCK,
GEORGE F. SWAIN,		WILLIAM J. WILGUS.

## *On Publications :*

	GEORGE H. PEGRAM,	
ALFRED CRAVEN,		FRANK C. OSBORN,
JOSEPH O. OSGOOD,		GEORGE S. DAVISON.

## *On Library :*

	CHARLES C. SCHNEIDER,	
MORDECAI T. ENDICOTT,		WILLIAM JACKSON,
EMIL KUICHLING,		CHARLES WARREN HUNT.

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## Special Committees.

### *On Uniform Tests of Cement :*

	GEORGE F. SWAIN,	
ALFRED NOBLE,		LOUIS C. SABIN,
GEORGE S. WEBSTER,		CLIFFORD RICHARDSON,
S. B. NEWBERRY,		F. H. LEWIS,
W. B. W. HOWE,		RICHARD L. HUMPHREY.

### *On Rail Sections :*

L. F. G. BOUSCAREN,	H. G. PROUT,
C. W. BUCHHOLZ,	JOSEPH T. RICHARDS,
S. M. FELTON,	PERCIVAL ROBERTS, JR.,
ROBERT W. HUNT,	GEORGE E. THACKRAY,
JOHN D. ISAACS,	EDMUND K. TURNER,
RICHARD MONTFORT,	WILLIAM R. WEBSTER.

# CLASSIFIED LIST.

## HONORARY MEMBERS.

[Hon. M. Am. Soc. C. E.]

	Date of Membership.
BAKER, Sir BENJAMIN. 2 Queen Square Pl., Queen Anne's Mansions, Westminster, London, S. W., England.....	May 5, 1897
CRAIGHILL, WILLIAM PRICE. ( <i>Past-President</i> ). Re- tired Chf. of Engrs. and Brig.-Gen., U. S. A., { M. Oct. 7, 1885 Charlestown, Jefferson Co., W. Va. .... { Hon. M. Mar. 23, 1896	
DAVIDSON, GEORGE. Prof. of Geography, Univ. of California, San Francisco, Cal.....	May 5, 1897
FOY, Sir DOUGLAS. 28 Victoria St., Westminster, London, { Cor. M. June 7, 1871	

## ERRATUM.

Page 30, Committee on Uniform Tests of Cement: transpose the names of George F. Swain and George S. Webster: the latter is Chairman of the Committee.

	Date of Membership.
GLEIM, CHARLES OTTO. Civ. and Cons. Engr., 184, Dorotheen-Strasse, Hamburg-Winterhude, Germany.....	April 5, 1876
PONTZEN, ERNEST. Civ. and Cons. Engr., 65 Rue Monceau, Paris, France.....	Jan. 5, 1876

Corresponding Members, 2.

## MEMBERS.

[M. Am. Soc. C. E.]

		Date of Membership.
ABBOT, FREDERIC VAUGHAN.	Maj., Corps of Engrs., U. S. A., Room 122, State, War and Navy Bldg., Washington, D. C.....	Dec. 3, 1884
ABBOT, FREDERICK WILLIAM.	Pres., Abbot-Gamble Contr. } Assoc. M. Co., 5 Times Bldg., New York City..... { M.	Oct. 7, 1891 April 1, 1896
ABBOTT, ARTHUR VAUGHAN.	8 Bridge St., New York City..... { Jun. } M.	Jan. 5, 1881 Dec. 4, 1901
ABERT, SYLVANUS THAYER.	Metropolitan Club, Washington, D. C....	Sept. 21, 1870
ADAM, ROBERT.	S. Pearson & Son, Ltd., Apartado 440, City of Mexico, Mexico.....	May 2, 1900
R. ADAMS, ARTHUR LINCOLN.	Mgr. and Engr., Contra Costa Water Co., 901 Broadway, Oakland, Cal.....	Oct. 2, 1895
ADGATE, GEORGE.	Western Mgr. of Foundation & Contr. Co., 2018 Wirt St., Omaha, Nebr.....	April 1, 1896
AERTSEN, GUILLIAEM.	Gen. Mgr., Latrobe Steel Co., 1200 Girard Bldg., Philadelphia, Pa.....	Oct. 1, 1890
AFRICA, JAMES MURRAY.	Chf. Engr., Penn. Midland R. R.; City Engr., Huntingdon, Pa.....	Sept. 2, 1896
AIKEN, WILLIAM AUGUSTIN.	Gen. Insp. of Material, Rapid Transit R. R. Commrs. of City of New York, 613 Empire Bldg., Pittsburg, Pa.....	Oct. 2, 1889
AINSWORTH, DANFORTH HURLBUT.	1240 West 10th St., Des Moines, Iowa.....	Mar. 3, 1886
ALDEN, JOHN FERRIS.	Rochester, N. Y.....	July 6, 1887
ALDERMAN, CHARLES ALDO.	Interurban Union Station, Co- } Assoc. M. lumbus, Ohio..... { M.	April 6, 1898 April 2, 1902
ALDRICH, TRUMAN HEMINWAY.	Birmingham, Ala.....	May 4, 1881
ALLAN PERCY.	Public Works Dept., Sydney, New South } Assoc. M. Wales, Australia..... { M.	April 1, 1896 Oct. 1, 1902
ALLEN, C. FRANK.	Prof. of R. R. Eng., Mass. Inst. Tech., Boston, Mass.....	Feb. 6, 1878
ALLEN, CALVIN HARLOW.	1 West 72d St., New York City.....	Sept. 7, 1887
ALLEN, CHARLES ALBERT.	Cons. Engr., Worcester, Mass.....	June 4, 1879
ALLEN, JAMES PIERSON.	8 Ladson St., Charleston, S. C..... { Jun. } M.	Mar. 5, 1879 June 4, 1884
ALLEN, KENNETH.	Engr. and Supt. of Water Dept., City Hall, Atlantic City, N. J.....	May 2, 1888
ALVORD, JOHN WATSON.	127 Hartford Bldg., Chicago, Ill.....	Jan. 4, 1893
AMBROSE, WILLIAM CREELMAN.	Chf. Engr., Fresno City Ry., Fresno, Cal.....	April 4, 1888

## MEMBERS A

		Date of Membership.
AMWEG, FREDERICK JAMES. Engr. and Mgr., Hawaiian Eng. & Constr. Co., Honolulu, Hawaiian Islands.....		Mar. 7, 1888
ANDERSEN, CHRISTIAN. 472 Park St., Portland, Ore.....		Jan. 2, 1901
ANDERSON, LATHAM. Kuttawa, Lyon Co., Ky. ....		May 2, 1888
ANDREWS, DANIEL MARSHALL. Care, U. S. Engr. Office, Montgomery, Ala. ....		Mar. 2, 1892
ANDREWS, DAVID HERBERT. Pres., The Boston Bridge Works, Inc.; Res., 38 Lake Ave., Newton Center, Mass.....		Sept. 2, 1885
ANDREWS, HORACE. 51 State St., Albany, N. Y. ....		April 6, 1887
ANGIER, WALTER EUGENE. Res. Engr., Thebes Bridge (Assoc. M. (So. Ill. & Mo. Bridge Co.), Thebes, Ill. ....	M.	Sept. 7, 1892
ANNAN, CHARLES LE ROY. Asst. Engr., Copper Range R. R., Houghton, Mich.....		Sept. 3, 1902
ANTHONY, CHARLES, JR. Glenview, Hereford, England.....		July 4, 1888
APPLETON, ELLERY CUSHING. Westboro, Mass.....		Mar. 5, 1902
APPLETON, THOMAS. Supt. of Constr., Public Bldgs., Creston, Iowa..		June 3, 1885
ARCHBOLD, JAMES. 424 Jefferson Ave., Scranton, Pa.....		April 4, 1883
ARCHER, WILLIAM. Prin. Asst. Engr., B. & O. S. W. R. R., Cincinnati, Ohio.....		May 15, 1872
ARCHIBALD, PETER SUTHER. Cons. Engr., Moncton, N. B., Canada..		Mar. 2, 1881
ARENTZ, FREDERICK CHRISTIAN HOLBERG. Chf. Engr., The Joliet Bridge & Iron Co., Joliet, Ill. ....	Assoc. M. (M.	Jan. 7, 1885
ARGOLLO, MIGUEL DE TEIVE E. Director and Chf. Engr., San Francisco R. R., Alagoinhas, Bahia, Brazil .....		May 6, 1891
ARMINGTON, JAMES HERVEY. Cons. Engr., Riverside, R. I.....		Oct. 3, 1900
ARTINGSTALL, SAMUEL GEORGE. 13 South Hamilton Ave., Chicago, Ill.....		Oct. 2, 1895
ASHMEAD, FRANK MILLIGAN. Asst. Engr., P. R. R. Co., 43d St., Pittsburgh, Pa.....		July 6, 1870
ASPINWALL, THOMAS. 3 Hamilton Pl., Boston, Mass.....		Oct. 6, 1886
ASSERSON, HENRY RAYMOND. Chf. Engr., Sewers, Borough of Brooklyn, N. Y.; Address, Floral Park, N. Y.....		July 6, 1887
ASSERSON, PETER CHRISTIAN. Rear-Admiral and Civ. Engr., U. S. N., 1529 Q St., N. W., Washington, D. C.....		May 2, 1888
ATKINSON, JOHN BOND. Pres., St. Bernard Min. Co., Earlington, Ky.....		Oct. 2, 1901
ATWATER, ALMON BYRON. Asst. to the Pres., Grand Trunk Ry. System, Detroit, Mich .....		July 5, 1882
ATWOOD, JOHN ABIEL. Chf. Engr., Pitts. & Lake Erie R. R., Pittsburgh, Pa.....		Sept. 5, 1877
AUCHINCLOSS, WILLIAM S. 36 West 12th St., New York City.....		May 5, 1886
AUS, GUNVALD. Cons. Engr., 111 Fifth Ave., New York City.....		Jan. 3, 1900
AXTELL, DECATUR. Vice-Pres., C. & O. Ry. Co., and Ohio Ry. Co., Richmond, Va.....		Feb. 17, 1869
AYCRIGG, WILLIAM ANDERSON. Civ. Engr., with U. P. R. & Assn. M. R., Omaha, Nebr.....	M.	April 3, 1895
AYRES, HENRY WILCOX. 66 State St., Hartford, Conn.....		Mar. 3, 1886
		May 4, 1892
		May 4, 1898
		Mar. 5, 1890

## MEMBERS B

Date of Membership.

BABCOCK, HENRY NASH.	U. S. Asst. Engr., Army Bldg., 39 Whitehall St., New York City.....	Sept.	3, 1884
BACON, JAMES HAYWARD.	U. S. Asst. Engr., U. S. Engr. Office, Fort Belvoir, Ill. ....	Jan.	3, 1900
BACON, JOHN WATSON.	Danbury, Conn.....	July	12, 1877
BACOT, WILLIAM SINCLAIR.	Engr. and Gen. Mgr., Consolidated Water Co. of Utica, N. Y., 234 Genesee St., Utica, N. Y.....	Oct.	1, 1890
N. BAUER, JULIUS.	Asst. Mgr. and Engr., Convey Placer Min. Co., Ruby, Mont. ....	Jun.	Sept. 7, 1887
		Assoc. M.	June 1, 1892
		M.	Feb. 6, 1901
BAILEY, GEORGE IRVING.	Cons. Engr., 1062 Tremont Ave., New York City.....	Oct.	1, 1890
BAKER, CHARLES HINCKLEY.	Pres. and Chf. Engr., Snoqualmie Falls & White River Power Co., Seattle, Wash.....	June	4, 1902
BAKER, HOLLAND WILLIAMS.	Kirkwood, Mo.....	May	7, 1890
BAKER, IRA OSBORN.	702 W. University Ave., Champaign, Ill.....	May	3, 1893
BAKER, WILLIAM EDGAR.	170 Broadway, New York City.....	June	1, 1898
BALBIN, ERNESTO JOAQUIN.	Chf. Engr. of the Light House Service of Cuba (Res., Virtudes 103), Havana, Cuba.....	Nov.	1, 1893
BALDWIN, FRED HIXON.	Supt., Bergenport Chemical Works, Standard Oil Co., Bayonne, N. J.....	Nov.	5, 1884
BALDWIN, HENRY FURLONG.	Chf. Engr., Chic. & Alton Ry., 919 Monadnock Bldg., Chicago, Ill.....	Assoc. M.	Dec. 7, 1892
		M.	Feb. 6, 1895
BALDWIN, THOMAS WILLIAMS.	Boothbay Harbor, Me.....	April	2, 1884
BALDWIN, WARD.	Cons. Engr., 9 West 4th St., Cincinnati, Ohio.....	Jun.	Mar. 2, 1881
		M.	Oct. 2, 1889
BALDWIN, WILLIAM HENRY.	Warburton Bldg., Yonkers, N. Y.....	June	6, 1888
BALDWIN, WILLIAM JAMES.	Cons. Engr., 107 West 17th St., New York City.....	Sept.	5, 1888
BALL, CHARLES BACKUS.	Chf. San. Insp., Tenement House Dept., 61 Irving Pl., New York City.....	Oct.	1, 1890
BALLARD, ROBERT.	35 Wood Lane, Shepherd's Bush, London, W., England.....	Sept.	1, 1880
BARBER, WILLIAM DAVIS.	Asst. Engr. in Chg., Div. of Pumping Station, Constr. and Repairs, Dept. of Public Works (Res., 1639 Roscoe St.), Chicago, Ill....	Assoc. M.	Sept. 1, 1897
		M.	Jan. 8, 1902
BARBOUR, FRANK ALEXANDER.	Civ. and San. Engr. (Snow & Barbour), 1120 Tremont Bldg., Boston, Mass.....	Sept.	5, 1900
BARCROFT, FREDERICK THOMAS.	Cons. Engr. and Archt. (Joy & Barcroft), 407 Ferguson Bldg., Detroit, Mich.....	Sept.	3, 1902
BARDOL, FRANK VALENTINE ERHARD.	Cons. and Contr. Engr., 400 D. S. Morgan Bldg., Buffalo, N. Y.....	May	2, 1900
BARLOW, JOHN QUINCY.	Chf. Engr., West. Md. R. R., Central Station, Cumberland, Md.....	Jun.	April 7, 1886
		M.	July 4, 1888
BARNARD, EDWARD CHESTER.	Topographer, U. S. Geological Survey, Washington, D. C.....	Dec.	3, 1902
BARNARD, JOHN FISKE.	Pres., St. Clair, Madison & St. L. Belt R. R. Co.; Res., 117 South 15th St., St. Joseph, Mo.....	Sept.	1, 1880



## MEMBERS B

		Date of Birth	
BARNES, OLIVER WILSON.	Cons. Engr., Fishkill, Dutchess Co., N. Y.	July 6, 1881	
BARNES, THOMAS HOWARD.	Civ. and Municipal Engr., 7 Water St., Boston, Mass.	Oct. 4, 1899	
BARR, JACOB NEFF.	Gen. Supt., C., M. & St. P. Ry., 335 Old Colony Bldg., Chicago, Ill.	Nov. 7, 1888	
BASSEL, ROBERT.	Grüner Weg, 49, II, Prenzlau, Germany.	May 2, 1888	
BASSETT, CARROL PHILLIPS.	Treas., Essex-Union Water & Light Co., Summit, N. J.	Nov. 7, 1888	
BASSETT, GEORGE BARCLAY.	316 Elmwood Ave., Buffalo, N. Y.	Mar. 1, 1896	
BATES, ONWARD.	Pres., Bates & Rogers Constr. Co., 1203 Manhattan Bldg., Chicago, Ill.	Jan. 4, 1882	
BAXTER, FRANK EDWIN.	Div. Engr., Rio Grande West. Ry., 1250 East South Temple St., Salt Lake City, Utah.	Oct. 2, 1901	
BAXTER, GEORGE STRONG.	Railroad and lumber business, 18 Wall St., New York City.	June 12, 1875	
BAYLISS, RAWLINSON TENNANT.	11 Cornhill, London, E. C., England.	May 3, 1876	
BEACH, ROBERT JAMES.	Pres., R. J. Beach Eng. Co., 149 Broadway, New York City.	June 4, 1899	
BEAHAN, WILLARD.	Div. Engr., C. & N. W. Ry., Winona, Minn.	May 2, 1900	
BEARD, EDWARD JAMES.	326 Gibraltar Bldg., Kansas City, Mo.	April 3, 1889	
BEARDSLEY, ARTHUR.	Prof. Emeritus of Eng., Swarthmore Coll., Swarthmore, Pa.	Feb. 7, 1900	
BEARDSLEY, JAMES WALLACE.	U. S. Asst. Engr., Manila, Philippine Islands.	Sept. 1, 1875	
BECKLER, ELBRIDGE HARLOW.	Civ. Engr., Director, Winston Bros. Co., 1838 Aldine Ave., Chicago, Ill.	Sept. 2, 1891	
BECKWITH, FRANK.	Engr. of Iowa Lines, C., B. & Q. R. R., Burlington, Iowa.	Dec. 4, 1901	
BELKNAP, WILLIAM ETHELBERT.	133 West 11th St., New York City.	Nov. 7, 1900	
BELL, ALONZO CLARENCE.	219 Carondelet St., Room 17, New Orleans, La.	Mar. 31, 1891	
BELL, ANDREW.	Cons. Engr., Almonte, Ont., Canada.	Mar. 6, 1895	
BELL, GEORGE JOSEPH.	County Surv. and Bridge Master, The Courts and 16 Portland Sq., Carlisle, England.	Dec. 1, 1897	
BELL, GILBERT JAMES.	Asst. Engr., A. T. & S. F. Ry. Co., 317 North Broad St., Galesburg, Ill.	Mar. 7, 1891	
BELL, HENRY PURDON.	Victoria, B. C., Canada.	Oct. 6, 1897	
BELL, JAMES RICHARD.	47 Victoria St., Westminster, London, S. W., England.	June 4, 1884	
BELLINGER, LYLE FREDERICK.	Acting Chf. Engr., U. S. Navy Yard, Brooklyn, N. Y.	Sept. 2, 1896	
BEMENT, ROBERT BUNKER COLEMAN.	Civ. and Cons. Engr., 506 Endicott Bldg., St. Paul, Minn.	Nov. 6, 1901	
BENSEL, JOHN ANDERSON.	Engr. in Chf., Dept. of Docks and Ferries, New York City.	Sept. 7, 1887	
		Sept. 2, 1885	
		Mar. 4, 1891	

## MEMBERS B

Date of Membership.

BENSON, ORVILLE. Engr., Am. Bridge Co., 51st and Butler Sts., Pittsburg, Pa .....	June 5, 1901
BENT, CORNELIUS CONWAY FELTON. Supt. and Gen. Agt., B. & O. R. R., 24th and Chestnut Sts., Philadelphia, Pa.....	May 1, 1889
BENZENBERG, GEORGE HENRY. Cons. Engr., Milwaukee, Wis.....	May 2, 1883
BERG, LOUIS DE COPPET. 76 Irving Pl., New York City.....	June 6, 1888
BERG, WALTER GILMAN. Chf. Engr., Lehigh Val. R. R. (Res., 261 West 52d St.), New York City.....	Sept. 2, 1891
BERGEN, VAN BRUNT. Shore Road and 77th St., Brooklyn, N. Y.....	Feb. 5, 1896
BERRIAN, RICHARD MILFORD. 255 West 128th St., New York City.....	June 17, 1868
BETTS, FRED KEELER. Asst. Engr., Dept. of Water Supply, Gas and Electricity, New York City, in Chg. of San. Patrol of the Croton, Bronx and Byram Watersheds, Katonah, N. Y.....	May 4, 1887
BIDDLE, JOHN. Maj., Corps of Engrs., U. S. A., Washington, D. C.	May 4, 1898
BIDDLE, WILLIAM FOSTER. 4305 Spruce St., Philadelphia, Pa.....	July 4, 1894
BIGELOW, EDWARD MANNING. Pittsburg, Pa.....	June 4, 1884
BILLIN, CHARLES EMERY. Pres., Am. Eng. Works, 1546 Marquette Bldg., Chicago, Ill.....	Dec. 4, 1889
BINKLEY, GEORGE HOLLAND. Engr. and Mgr., Ry. Dept., Kohler Bros., Contr. Elec. Engrs., 1804 Fisher Bldg., Chicago, Ill.....	April 5, 1876
BISBEE, FRED MILTON. Gen. Mgr., Los Angeles Land & Water Co., Los Angeles, Cal.....	July 3, 1878
BISHOP, GEORGE H. 129 Main St., Middletown, Conn. ....	Oct 1, 1902
BISSELL, FRANK EDWARD. First Asst. Engr., L. S. & M. S. Ry., Cleveland, Ohio.....	May 3, 1899
BISSELL, HEZEKIAH. Chf. Engr., B. & M. R. R., West Medford, Mass.	Aug. 7, 1872
BIXBY, WILLIAM HERBERT. Maj., Corps of Engrs., U. S. A., U. S. Engr. Office, Detroit, Mich.....	April 2, 1884
R. BLACK, WILLIAM MURRAY. Maj., Corps of Engrs., U. S. A., Commanding Engr. School of Application, U. S. A., 3d Battalion, U. S. Engrs., Post of Washington Barracks, D. C., and Engr. Depot at Washington Barracks, Washington, D. C.....	Sept. 2, 1891
BLACKFORD, FRANCIS WEBSTER. Chf. Engr., Cerro de Pasco Co., Cerro de Pasco, Peru.....	Sept. 15, 1869
BLACKWELL, CHARLES. Cons. Engr., Mount Lookout, Cincinnati, Ohio.....	April 5, 1882
BLAISDELL, ANTHONY HOUGHTALING. U. S. Asst. Engr., in local Chg. of Constr., Lock and Dam No. 1, Osage River, Mo., 2918 Morgan St., St. Louis, Mo.....	June 6, 1888
BLANEY, GEORGE HENRY. Chf. Engr., Passaic Rolling Mill Co., Paterson, N. J.....	June 4, 1888
BLAKESLEE, CLARENCE. 598 George St., New Haven, Conn.....	April 4, 1888
BLAIR, GEORGE PIERREPONT. 510 Harrison Bldg., Philadelphia, Pa.....	Sept. 7, 1881
BLATT, JOHN CARLISLE. Engr. of Bridges, Penn. Lines W. of Pitts., Pittsburg, Pa.....	Mar. 3, 1880
	Dec. 4, 1889
	Oct. 2, 1895
	June 4, 1895
	June 7, 1875
	May 4, 1881
	May 12, 1875
	June 4, 1879

## MEMBERS B

	Date of Membership.	
BLUNT, WILLIAM TITCOMB. U. S. Asst. Engr., U. S. Engr. Office, Cleveland, Ohio (Res. and P. O. Address, Toledo, Ohio.).....	Oct.	5, 1898
BODY, JOHN BENJAMIN. Director of S. Pearson & Son, Ltd., Puente de Alvarado 15, City of Mexico. } Assoc. M.	Oct.	2, 1895
Mexico..... } M.	May	2, 1900
BOEHMER, MAX. Min. Engr., 42 Jacobson Bldg., Denver, Colo.....	Oct.	5, 1898
BOGART, JAMES PETER. Office, 82 Church St. (Res., 684 } Jun.	Jan.	4, 1882
Whitney Ave.), New Haven, Conn..... } M.	July	3, 1895
BOGAERT, JOHN. Cons. Engr., 40 Wall St., New York City.....	Feb.	17, 1869
BOGGS, EDWARD MARSHALL. Chf. Engr., Oakland Transit, Oakland, Cal.	June	6, 1900
BOGUE, VIRGIL GAY. 65 Broadway, New York City (Res., 458 Washington Ave., Brooklyn, N. Y.).....	Sept.	15, 1869
BOLLER, ALFRED PANCOAST. Cons. Engr. (Boller and Hodge), 1 Nassau St., New York City.....	Dec.	4, 1867
BOLTON, CHANNING MOORE. Cons. Engr., Rio, Albemarle Co., Va.....	Jan.	4, 1888
BOLTON, REGINALD PELHAM. Cons. Engr., 35 Nassau St., New York City.....	Sept.	6, 1899
BOND, EDWARD AUSTIN. State Hall, Albany, N. Y.....	Sept.	6, 1899
BOND, FREDERICK WINN. Chf. Engr., Ft. Smith & West. R. R., Fort Smith, Ark.....	Dec.	7, 1898
BOND, GEORGE MEADE. 141 Washington St., Hartford, Conn.....	Feb.	2, 1887
BONNETT, WILLIAM WHITLOCK. Waterbury, Conn.....	Sept.	4, 1872
BONTECOR, DANIEL. 606 Postal Telegraph Bldg., Kansas City, Mo.....	Nov.	5, 1879
BONZANO, ADOLPHUS. 331 South 18th St., Philadelphia, Pa.....	Aug.	7, 1872
BONZANO, MAXIMILIAN FERDINAND. Chf. Engr., The Pitts., Shawmut & Northern R. R. Co., Olean, N. Y.....	Jan.	6, 1886
BOOTH, WILLIAM HENRY. 2 Queen Anne's Gate, Westminster, London, S. W., England.....	July	4, 1888
BOTH, CARL CHRISTIAN ADOLPH. U. S. Asst. Engr., U. S. Engr. Office, Portland, Me.....	Sept.	2, 1891
BOTT, JOHN B. Engr., P. R. R., 317 South Main St., Greensburg, Pa.	Oct.	1, 1890
BOUSCAREN, LOUIS FREDERIC GUSTAVE. (Vice-President). Cons. Engr., City Hall, Cincinnati, Ohio.....	April	7, 1875
BOWERS, GEORGE. City Engr., 359 Westford St., Lowell, Mass.....	Oct.	1, 1902
BOWIE, AUGUSTUS JESSE. Cons. Engr., 217 Sansome St., San Francisco, Cal.....	Nov.	1, 1882
BOWMAN, AUSTIN LORD. Civ. and Cons. Engr., 29 Broad } Assoc. M.	Sept.	7, 1892
way, Room 174, New York City..... } M.	Dec.	1, 1897
BOYNTON, GEORGE HERBERT. Pres., Gen. Constr. Co., Davenport, Iowa.	Sept.	3, 1884
BRACKENRIDGE, JOHN CROSBIE. Gen. Mgr., Brooklyn Heights R. R. Co., 168 Montague St., Brooklyn, N. Y.....	May	5, 1897
BRACKENRIDGE, WILLIAM ALGERNON. Cons. Engr., Niagara Falls Power Co., and Canadian Niagara Power Co., Niagara Falls, N. Y.....	June	2, 1886
BRACKETT, DEXTER. Engr., Distrib. Dept., Met. Water-Works, 1 Ashburton Pl., Boston, Mass.....	June	6, 1888
BRADFORD, WILLIAM. Mgr., Pittsburg office, Westinghouse, Church, Kerr & Co., Westinghouse Bldg., Pittsburg, Pa.....	Dec.	7, 1898
BRADLEY, DANIEL EDWARD. Berlin, Conn.....	May	1, 1895

## MEMBERS B

		Date of Membership.
BRADLEY, WILLIAM HAMMATT.	53 State St., Boston, Mass.....	Feb. 5, 1879
BRAMWELL, GEORGE WASHINGTON.	Cons. Engr., 335 Broadway, New York City.....	Mar. 1, 1893
BRECKINRIDGE, CABELL.	Cons. Civ. Engr., Danville, Ky. ....	June 1, 1881
BREEN, HOWARD.	244 S. Euclid St., Pasadena, Cal.....	April 4, 1888
R. BREITHAUP, WILLIAM HENRY.	Cons. Engr., Berlin, Ont., Can- ada.....	{ Jun. June 4, 1884 M. July 6, 1887
BREMNER, GEORGE HAMPTON.	Engr. of Ill. Lines of C., B. & Q. Ry., 209 Adams St., Chicago, Ill.....	Dec. 6, 1899
BRENDLINGER, PETER FRANKLIN.	Civ. Engr. and Contr., Room 1009, Atlee Bldg., Philadelphia, Pa.....	Sept. 7, 1887
BREUCHAUD, JULES.	Engr. and Contr., Croton Dam Con- tract, Croton-on-Hudson, N. Y. (Res., Park Hill, Yonkers, N. Y.).....	{ Assoc. June 5, 1889 M. Oct. 5, 1898
BRIGGS, JOSIAH ACKERMAN.	(Director). Chf. Engr. in and for the Borough of the Bronx, New York City.....	Sept. 1, 1886
BRIGGS, ROSWELL EMMONS.	Apartado 561, City of Mexico, Mexico...	Sept. 15, 1869
BRINCKERHOFF, ALEXANDER GORDON.	Supt., Works, Johnson & Morris, 30 West 13th St., New York City.....	Nov. 3, 1886
BRINCKERHOFF, HENRY WALLER.	Cons. Engr., 45 Broadway, New York City.....	Nov. 7, 1883
BRINSMADE, DANIEL SEYMOUR.	Pres., The Ousatonic Water Co., Derby, Conn.....	Feb. 1, 1888
BRODHEAD, CALVIN EASTON.	Greenville, Mercer Co., Pa.....	Feb. 21, 1872
BROOKS, FREDERICK.	31 Milk St., Boston, Mass.....	{ Jun. June 7, 1876 M. Jan. 2, 1884
BROWN, ALBA FISK.	271 Fortieth St., Pittsburg, Pa.....	Sept. 7, 1887
BROWN, CHARLES CARROLL.	Cons. Engr.; Editor, <i>Municipal Engineer- ing Magazine</i> , 84 Commercial Club Bldg., Indianapolis, Ind ...	Oct. 2, 1895
BROWN, CHARLES OTTO.	200 Bushwick Ave., Brooklyn, N. Y..	{ Jun. Jan. 6, 1875 M. Nov. 7, 1877
BROWN, LE GRAND.	Cons. Engr., 16 State St., Rochester, N. Y.....	May 4, 1898
BROWN, LINUS WEED.	741 Carondelet St., New Orleans, La.....	June 7, 1899
BROWN, RALPH HENRY.	Chf. Engr., Eastern Bridge & Structural Co., Station A, Worcester, Mass.....	June 7, 1899
BROWN, THOMAS ELLIS.	Chf. Engr., Otis Elevator Co., 71 Broad- way, New York City.....	{ Jun. Nov. 3, 1880 M. April 2, 1884
BROWN, WENDELL PHILLIPS.	Engr., The King Bridge Co., { Cleveland, Ohio.....	{ Assoc. M. Oct. 2, 1895 M. Mar. 5, 1902
BROWN, WILLIAM MAXWELL.	Engr., Met. Sewerage Works, Pemberton Bldg., Boston, Mass.....	Feb. 5, 1896
BROWNE, GEORGE HAMILTON.	Poindexter, Louisa Co., Va.....	Sept. 3, 1884
BROWNE, WILLIAM ROBERT.	Supt., Bureau of Surveys, City Eng. Office, Pittsburg, Pa.....	June 1, 1898
BROWNLEE, JAMES LEEMAN.	Office, Chf. Engr., C. R. R. Co. of N. J., Jersey City, N. J. ....	May 6, 1896
BRUCE, FRED WILLIAM.	U. S Asst. Engr., Mayport, Fla.....	April 4, 1900



# MEMBERS B

(Entered May, 1888)

BRUNNER, JOHN. Asst. Gen. Supt., North Works, Ill. Steel Co., Chicago, Ill. (Res., 1732 Chicago Ave., Evanston, Ill.).....	Mar. 2, 1898
BRYSON, ANDREW. Pres. and Treas., Brylgon Steel Casting Co., Reading, Pa.....	April 1, 1885
BUCHANAN, EDWARD EVERETT. Pres., Elmira Rolling Mill Co., Elmira, N. Y.....	Dec. 4, 1889
BUCHHOLZ, CARL WALDEMAR. Chf. Engr., Erie R. R., 21 Cortlandt St., New York City.....	Sept. 1, 1886
N. BUCK, LEFFERT LEFFERTS. Chf. Engr., New East River Bridge Comm., 84 Broadway, Brooklyn, N. Y.; Private office, 46 East 21st St., New York City.....	Feb. 3, 1875
R. BUCK, RICHARD SUTTON. (Director). Chf. Engr., Dominion Bridge Co., Montreal, Que., Canada; Ad- dress, Lachine Locks, Que., Canada.....	Assoc. M. April 5, 1893 M. Mar. 2, 1898
BUCK, WALDO EMERSON. Pres. and Treas., Worcester Mfrs. Mutual Insurance Co., 53 William St., Worcester, Mass.....	July 3, 1889
BUDGE, EDWARD BARNARD. Engr. in Chf., 1st Section, Chili State Rys., Bella Vista Station, Valparaiso, Chili.....	Nov. 6, 1901
BUDGE, ENRIQUE. Valparaiso, Chili.....	Feb. 1, 1882
BULLOCK, WILLIAM DEXTER. Asst. Engr. in Chg., Bridges and Harbor, City Engr.'s Office, Providence, R. I.....	Jun. Sept. 5, 1887 M. July 4, 1888
BURBANK, GEORGE BARKER. Cons. Engr., 11 Broadway, New York City.....	July 4, 1888
BURDEN, JAMES A. Pres., The Burden Iron Co., Troy, N. Y.....	July 2, 1879
BURKE, MILO DARWIN. 406 Pike Bldg., Cincinnati, Ohio.....	July 4, 1894
BURNS, EDWARD COOK. 417 Spring St., Jamestown, N. Y.....	July 5, 1882
BURNS, ROBERT BRUCE. Chf. Engr., A., T. & S. F. Ry., Pacific System, and Chf. Engr., S. C. Ry. Co., 2642 Vermont Ave., Los Angeles, Cal.....	Sept. 5, 1900
BURPEE, MOSES. Chf. Engr., Bangor & Aroostook R. R., Houlton, Me.....	Sept. 3, 1884
BURR, EDWARD. Capt., Corps of Engrs., U. S. A., Washington Barracks, Washington, D. C.....	May 6, 1891
R. BURR, WILLIAM HUBERT. Prof. of Civ. Eng., Columbia Univ.; Cons. Engr., 151 West 74th St., New York City.....	Jun. June 3, 1874 Assoc. May 5, 1880 M. Mar. 3, 1886
BURROWES, FRANCIS SMITH. U. S. Asst. Engr., U. S. Engr.'s Office, Portland, Me.....	June 6, 1888
BURTON, ALFRED EDGAR. Prof. of Topographical Eng., Mass. Inst. Tech., Boston, Mass.....	Sept. 4, 1901
BURTON, STANDISH BARRY. Gen. Mgr., La Belle Creale Min. Co., Saltillo, Coahuila, Mexico.....	June 1, 1898
BUSH, HARRY DEAN. Care, Dominion Bridge Co., Ltd., Montreal, Que., Canada.....	May 2, 1888
BUTLER, MATTHEW JOSEPH. Chf. Engr., The Locomotive & Machine Co. of Montreal, 51 Street Railway Chambers, Montreal, Que., Canada.....	April 1, 1885
BUTTERFIELD, FRANCIS EAVES. Culiacan, Estado de Sinaloa, Mexico..	Sept. 1, 1886



## MEMBERS B-C

		Date of Membership.
BUXTON, CLIFFORD.	Chf. Engr., T. & O. C. and K. & M. Rys., Toledo, Ohio.....	May 6, 1885
C. BYERS, MORTON LEWIS.	Asst. to the Gen. Mgr., B. & O. R. R., { Jun. B. & O. Central Bldg., Baltimore, Md..... } M.	Jan 2, 1890 Sept. 7, 1898
BYLESBY, HENRY MANSON.	309 Merchants Loan & Trust Bldg., Chicago, Ill.....	June 1, 1887
CAIN, WILLIAM.	Univ. of North Carolina, Chapel Hill, N. C.....	Nov. 7, 1888
CAIRNS, ROBERT ANDREW.	City Engr., Waterbury, Conn.....	Oct. 2, 1895
CALKINS, FRANK AUGUSTUS.	Edgewater, Jefferson Co., Colo.....	April 5, 1882
CAMP, WALTER MASON.	7418 Parnell Ave., Chicago, Ill.....	May 1, 1901
CAMPBELL, HARRY HUSE.	Gen. Mgr., The Pennsylvania Steel Co., Steelton, Pa.....	June 6, 1894
CAMPBELL, JOHN LOGAN.	Chf. Engr., Gasconade Ry. Constr. Co., 911 Security Bldg., St. Louis, Mo.....	May 1, 1901
CANFIELD, EDWARD.	Gen. Supt., N. Y., O. & W. Ry. Co., Middletown, N. Y.....	Dec. 3, 1879
CAPLES, MARTIN JOSEPH.	Treas. and Supt., Pocahontas { Assoc. M. Coal & Coke Co., 1218 Arcade Bldg., Philadelphia, Pa. } M.	Nov. 4, 1891 Oct. 4, 1899
CAPPELEN, FREDERICK WILLIAM.	Cons. Engr., Oneida Blk., Minneapolis, Minn.....	April 3, 1895
CARD, WILLIAM WARREN.	Vice-Pres., The Westinghouse Air Brake Co., Pittsburg, Pa.....	Sept. 5, 1883
CARLL, DAVID SYLVANUS.	Chf. Engr. and Supt., Capital { Jun. Traction Co., Washington, D. C..... } Assoc. M. M.	Mar. 7, 1888 July 1, 1891 Oct. 7, 1896
CAROTHERS, DANIEL DAWSON.	Gen. Supt., B. & O. S. W. R. R., Cincinnati, Ohio.....	April 4, 1894
CARPENTER, GEORGE ANSEL.	City Engr., Pawtucket, R. I.....	May 7, 1902
CARR, WALTER FRANK.	Chf. Engr., The Falk Co., Milwaukee, Wis...	June 6, 1894
CARROLL, EUGENE.	Chf. Engr. and Supt., Butte Water { Jun. Co., Butte, Mont..... } Assoc. M. M.	Jan. 4, 1888 July 1, 1891 June 2, 1897
CARSON, HOWARD ADAMS.	Chf. Engr., Boston Transit Comm., 20 Beacon St., Boston, Mass.....	Feb. 7, 1894
CARSON, WILLIAM WALLER.	Prof. of Civ. Eng., Univ. of Tennessee, Knoxville, Tenn.....	Nov. 2, 1892
CARTER, EDWARD CARLOS.	(Director). Chf. Engr., C. & N. W. Ry., Chicago, Ill.....	April 4, 1888
CARTER, HENRY HALL.	Cons. Engr. and Pres., Met. Contr. Co., 95 Milk St., Boston, Mass.....	May 7, 1890
CARTER, J. RIVERS.	Southern Club, Birmingham, Ala.....	Feb. 3, 1892
CARTWRIGHT, ROBERT.	Cons. Engr., 6 Berkeley St., Rochester, N. Y..	July 10, 1872
CARY, EDWARD RICHARD	(Cary & Roemer), 408 Times Bldg., and Asst. Prof. of Geodesy, etc., Rensselaer Polytechnic Inst., Troy, N. Y.	April 2, 1902
CATT, GEORGE WILLIAM.	Pres. and Chf. Engr., Atlantic, Gulf & Pacific Co.; Cons. Engr., San Francisco Bridge Co.; Cons. Engr., Puget Sound Bridge & Dredging Co., Park Row Bldg., New York City..	Sept. 7, 1892

## MEMBERS C

		Date of Membership	
C	CATTELL, WILLIAM ASHBURNER. Cons. Engr., 52 Broadway, New York City.....	{ Assoc. M.	May 6, 1894
		{ M.	Oct. 7, 1896
	CHAMBERLAIN, PHILLIP WILLIAM. Cons. Engr., Dept. of Public Works of Niagara, Greytown, Niagara.....		Oct. 2, 1895
R.	CHANUTE, OCTAVE. ( <i>Past-President</i> ). Cons. Engr., 413 East Huron St., Chicago, Ill.....	{ M.	Feb. 19, 1868
		{ F.	July 11, 1872
	CHAPIN, LOOMIS EATON. Civ. and Cons. Engr., Central Savings Bank Bldg., Canton, Ohio.....	{ Jun.	Dec. 3, 1884
		{ Assoc. M.	Sept. 7, 1892
		{ M.	Nov. 4, 1896
	CHAPMAN, JAMES RUSSELL. Gen. Mgr. and Chf. Engr., Underground Elec. Rys. Co. of Lond., Ltd., 37 Hamilton House, Victoria Embankment, London, E. C., England.....		Mar. 6, 1901
	CHASE, CHARLES FRANCIS. Civ. and Cons. Engr., 75 Westminster St., Providence, R. I.....		Jan. 1, 1896
	CHASE, CHARLES FRANCIS. Chf. Engr., Berlin Constr. Co., Berlin, Conn. (Res., 241 West Main St., New Britain, Conn.).....		Feb. 5, 1902
	CHASE, FRANK LYNTON. Pres., Jamestown, Chautauqua & Lake Erie Ry.; Pres., Chautauqua Steamboat Co., Jamestown, N. Y.....	{ Assoc. M.	Nov. 4, 1896
		{ M.	Nov. 1, 1899
	CHASE, JOHN CARROLL. Chf. Engr., The Clarendon Water-Works Co., Wilmington, N. C.....		Mar. 1, 1893
	CHASE, WILLIAM BEVERLY. 154 East 18th St., Portland, Ore.....		Sept. 6, 1899
	CHEEVER, ALBERT SAFFORD. Supt., Fitchburg Div., B. & M. R. R., Boston, Mass.....		June 7, 1893
	CHENEY, JOHN EUGENE. Asst. City Engr., 50 City Hall, Boston, Mass.		May 7, 1884
	CHESTER, JOHN NEEDELS. Chf. Engr., Am. Water-Works & Guarantee Co., 1200 Bank for Savings Bldg., Pittsburg, Pa.....	{ Jun.	Dec. 6, 1892
		{ Assoc. M.	Dec. 5, 1894
		{ M.	Mar. 6, 1901
	CHIBAS, EDUARDO JUSTO. Cons. Engr. and Contr., Apartado 110, Santiago de Cuba, Cuba.....	{ Jun.	Mar. 31, 1891
		{ Assoc. M.	May 6, 1896
		{ M.	Jan. 3, 1900
	CHILD, STEPHEN. Woodland Park Hotel, Auburndale, Mass.....		Oct. 5, 1898
	CHILDS, JAMES EDMUND. Gen. Mgr., N. Y., O. & W. Ry., 56 Beaver St. (Res., 300 West 93d St.), New York City.....		Dec. 4, 1878
	CHILDS, OLIVER W. Chf. Engr., Stupp Bros. Bridge & Iron Co., 2301 South 7th St., St. Louis, Mo.....	{ Assoc. M.	Sept. 5, 1900
		{ M.	Sept. 3, 1902
	CHIPMAN, WILLIS. 103 Bay St., Toronto, Ont., Canada.....		June 6, 1888
	CHITTENDEN, HIRAM MARTIN. Capt., Corps of Engrs., U. S. A., Sioux City, Iowa.....		Feb. 7, 1900
	CHRISTIE, GEORGE B. 171 La Salle St., Chicago, Ill.....		Oct. 2, 1895
N.	CHRISTIE, JAMES. Chf. Engr., Mech. Dept., Am. Bridge Co., Peneoyed, Pa.		May 7, 1873
	CHURCH, CHARLES TITUS. 155 William St., Geneva, N. Y.....		May 1, 1889
	CHURCH, GEORGE EARL. Dashwood House, 9 New Broad St., London, E. C., England.....		Nov. 2, 1887
	CHURCHILL, CHARLES SAMUEL. Chf. Engr., Norfolk & West. Ry., Roanoke, Va.....		May 1, 1889
	CHURCHILL, JOHN CHARLES, JR. U. S. Asst. Engr., Oswego, N. Y.....		Feb. 1, 1892
	CLAPP, OTIS FRANCIS. City Engr., Providence, R. I.....		Mar. 2, 1898

## MEMBERS C

		Date of Membership.	
CLARK, CHARLES HENRY. Chf. Engr., Utica & Mohawk Val. Ry. Co., 861 Bleecker St., Utica, N. Y.....	May	7, 1902	
CLARK, GEORGE HUNTINGTON. Genl. Mgr., Birmingham Belt R. R. Co., Birmingham, Ala.....	Mar.	5, 1890	
CLARKE, DAVID DEXTER. Engr., The Water Committee, City Hall, Portland, Ore. ....	July	5, 1882	
N. CLARKE, ELIOT CHANNING. 15 Brimmer St., Boston, Mass.....	Sept.	4, 1878	
CLARKSON, ROBERT COOKE. Cons. Engr., 710 Stephen Girard } Jun. Bldg., Philadelphia, Pa. .... } M.	Jan.	5, 1887	
	Jan.	2, 1901	
CLAUSSEN, OSCAR. Cons. Civ. and Elec. Engr., Room 16, National German Am. Bank Bldg., St. Paul, Minn.....	Oct.	2, 1901	
CLAYTON, ROBERT MORRIS. City Engr., Atlanta, Ga. ....	Mar.	4, 1896	
CLEMENT, FRANK HUDSON. Engr. and Contr., 32 South Broad St., Philadelphia, Pa.....	Nov.	1, 1882	
CODWISE, EDWARD BERTIE. City Engr., Kingston, Ulster Co., N. Y....	Sept.	5, 1888	
COE, WILLIAM WATSON. Engr., Constr. Work, Branch Lines, N. & W. Ry. Co., Kenova, W. Va.....	April	3, 1889	
COFFIN, AMORY. 33 East 17th St., New York City.....	Mar.	3, 1875	
COFFIN, FREEMAN CLARKE. Civ. and Hydr. Engr., 53 State St., Boston, Mass.....	Feb.	6, 1895	
COFFIN, THOMAS AMORY. Engr. and Contr., 45 Broadway, New } Jun. York City..... } M.	Oct.	2, 1894	
	Feb.	1, 1899	
COGSWELL, WILLIAM BROWN. Vice-Pres. and Managing Di- } Assoc. rector, The Solvay Process Co., Syracuse, N. Y..... } M.	Feb.	15, 1871	
	Oct.	16, 1872	
COHEN, FREDERICK WILLIAM. Engr. of Erection, Bridge and } Assoc. M Constr. Dept., The Pennsylvania Steel Co., Steelton, } M.	Feb.	3, 1897	
	Sept.	3, 1902	
COHEN, MENDES. ( <i>Past-President</i> ). 825 North Charles St., Balti- more, Md.....	Dec.	4, 1867	
COLBY, BRANCH HARRIS. Civ. and Cons. Engr. (Colby & Baker), 708 Lincoln Trust Bldg., St. Louis, Mo.....	June	5, 1895	
COLE, HOWARD JUDSON. 29 Broadway, New York City.... } Assoc. M. } M.	Jan.	6, 1892	
	Mar.	1, 1899	
COLE, JOHN ADAMS. Cons. Engr. (John A. Cole & Son), 1580 Old Colony Bldg., Chicago, Ill.....	Mar.	7, 1894	
COLEMAN, CLARENCE. U. S. Asst. Engr., Duluth, Minn.....	Nov.	3, 1897	
COLEMAN, JOHN FRANCIS. Cons. Engr. (Coleman, Malochée & Villeré), Suite 1109, Hennen Bldg., New Orleans, La.....	Oct.	2, 1901	
COLLINGWOOD, FRANCIS. Cons. Engr., Elizabeth, N. J.; Office address, 220 West 57th St., New York City.....	Mar.	3, 1869	
COLLINS, DANIEL CHARLES NEWMAN. 29 Broadway, New York City..	April	3, 1901	
COMSTOCK, CYRUS BALLOU. Bvt. Brig.-Gen., U. S. A., 124 East 27th St., New York City.....	Sept.	1, 1880	
CONNELL, S. THEODORE LINCOLN. Cons. Engr. and Repr. } Assoc. M. tentative of the Pittsburg Testing Laboratory, Ltd., } M. 1750 Monadnock Bldg., Chicago, Ill.....	Feb.	1, 1899	
	Oct.	2, 1901	
CONNETT, ALBERT NEWMANN. Chf. Engr., J. G. White & Co., } Jun. Ltd., 22a College Hill, London, E. C., England..... } M.	June	6, 1883	
	Oct.	1, 1890	

## MEMBERS C

		Date of Membership	
CONNOR, EDWARD HANSON. Engr., Missouri Vrd. Bridge & Iron Works, Leavenworth, Kans.	Jun.	Feb.	5, 1890
	Assoc. M.	Feb.	3, 1892
	M.	April	1, 1900
CONSTABLE, CASIMIR. Constableville, N. Y.		June	17, 1868
CONSTABLE, HOWARD. Archt. and Engr., 22 East 16th St., New York City		Dec.	7, 1892
COOKE, CHARLES HENRY. Chf. Engr., Jamestown, Chautauqua & Lake Erie Ry., 55 Broadway (Res., 32 West 21st St.), New York City.		Mar.	1, 1899
COOLEY, LYMAN EDGAR. 21 Quincy St., Chicago, Ill.		June	1, 1898
COOMBS, STEPHEN ELBRIDGE. Asst. Chf. Engr., St. L., M. & S. E. R. R., Room 510, Granite Bldg., St. Louis, Mo.		Sept.	3, 1902
COOPER, SAMUEL LISPENARD. Commr. of Public Works, Yonkers, N. Y.		Feb.	5, 1889
N. COOPER, THEODORE. Cons. Engr., 35 Broadway, New York City		Mar.	4, 1874
CORNELL, GEORGE BIRDSALL. Cons. Engr., 52 Broadway, New York City	Jun.	Aug.	5, 1879
	M.	Oct.	6, 1886
CORTHELL, ARTHUR BATEMAN, Terminal Engr., N. Y. C. & H. R. R., 110 East 50th St., New York City		Mar.	1, 1899
CORTHELL, ELMER LAWRENCE. 1 Nassau St., New York City		Sept.	2, 1874
COTTON, JOSEPH P. Newport, R. I.		June	7, 1876
COURTENAY, WILLIAM HOWARD. Prin. Asst. Engr., L. & N. R. R. Co., Louisville, Ky.		July	3, 1889
COVODE, JAMES HENRY. 1913 Pacific Ave., San Francisco, Cal.		April	2, 1890
COWLES, WALTER LINSLEY. Secy., D. F. Holman Ry. Tracklayer Co., 146 Hartford Bldg., Chicago, Ill.		Mar.	6, 1889
COX, ABRAHAM BEEKMAN. Cherry Valley, N. Y.		April	1, 1874
CRAIG, CHAMBERS MCKIBBIN. Address unknown		Nov.	3, 1886
CRAIGHILL, WILLIAM PRICE. (Past-President). Retired Chf. of Engrs. and Brig.-Gen., U. S. A., Charlestown, Jefferson Co., W. Va.	M.	Oct.	7, 1885
	Hon. M.	Mar.	23, 1896
CRANDALL, CHARLES LEE. Prof. of Ry. Eng. and Geodesy; in Chg. of the Coll. of Civ. Eng., Cornell Univ., Ithaca, N. Y.	Jun.	June	7, 1876
	M.	Oct.	5, 1892
CRANE, ALBERT SEARS. Prin. Asst. Engr., San. Dist. of Chicago, 1003 Security Bldg., Chicago, Ill.	Jun.	Sept.	3, 1895
	Assoc. M.	May	4, 1898
	M.	Mar.	1, 1901
CRANE FRANCIS ELIHU. City Engr., Amsterdam, N. Y.		Oct.	1, 1902
CRAVEN, ALFRED. (Director). Div. Engr., Rapid Transit R. R. Comms., 147 Columbus Ave., New York City (Res., 53 Highland Ave., Yonkers, N. Y.)		Dec.	5, 1888
CRAWFORD, WILLIAM. P. O. Box 345, Ottawa, Ont., Canada		Nov.	7, 1888
CREHORE, WILLIAM WILLIAMS. 39 Cortlandt St., New York City	Assoc. M.	April	1, 1894
	M.	Sept.	3, 1902
CREUZBAUR, ROBERT WALLER. 280 Broadway, Room 52, New York City	Jun.	April	2, 1890
	Assoc. M.	April	1, 1894
	M.	April	1, 1900
CROCKER, HERBERT SAMUEL. Prin. Asst. to the Erecting Mgr., Western Div., Am. Bridge Co. of N. Y., 1247 Monadnock Bldg., Chicago, Ill.		Oct.	2, 1901



## MEMBERS C-D

		Date of Membership.	
N. CROES, JOHN JAMES ROBERTSON. ( <i>Past-President</i> ). Cons. Engr.,			
68 Broad St., New York City.....		Dec.	4, 1867
CROSBY, BENJAMIN LINCOLN. Asst. Auditor, Missouri Lines, {	Jun.	June	2, 1880
C., B. & Q. Ry. Co., St. Joseph, Mo.....	M.	Oct.	6, 1886
CROSBY, HORACE. City Engr., New Rochelle, N. Y.....		Feb.	17, 1869
CROSBY, WILSON. Bangor, Me.....		Sept.	15, 1869
CROWELL, FOSTER. Cons. Civ. Engr., 18 Broadway, New York City..		Dec.	1, 1880
CRUMP, RALPH LEE. Cons. Engr., 317 Keith and Perry Bldg., Kansas			
City, Mo.....		Dec.	3, 1902
CUMMING, ADELBERT EUGENE. Engr. and Supt. of Irrig. Constr., Ft.			
Belknap, Harlem, Mont.....		June	6, 1894
CUMMINGS, ROBERT AUGUSTUS. Civ. and Contr. Engr., {	Jun.	Oct.	1, 1890
609 House Bldg., Pittsburg, Pa.....	Assoc. M.	May	4, 1892
	M.	June	1, 1898
CUMMINGS, WILLIAM WARREN. Engr., The New England Gas & Coke			
Co., The Mass. Pipe Line Gas Co., Everett, Mass.....		June	7, 1899
CUNNINGHAM, ANDREW CHASE. Civ. Engr., U. S. N., U. S. {	Assoc. M.	Sept.	2, 1891
Naval Station, New Orleans, La.....	M.	Oct.	3, 1894
CUNNINGHAM, ANDREW OSWALD. Bridge Engr., Wabash R. R., Lincoln			
Trust Bldg., St. Louis, Mo.....		Feb.	5, 1902
CUNNINGHAM, DAVID WEST. 627 West 18th St., Los Angeles, Cal.....		May	7, 1873
CUNNINGHAM, JAMES HENRY. 2 Ravelston Pl., Edinburgh, Scotland..		Aug.	6, 1879
CURTIS, FAYETTE SAMUEL. Fourth Vice-Pres., N. Y., N. H. & H. R. R.			
Co., South Terminal Station, Boston, Mass.....		April	3, 1889
CURTIS, WALTER WHALEY. Cons. Engr., 324 Dearborn St., Room 650,			
Chicago, Ill.....		Sept.	5, 1888
CUSHING, EDWARD BENJAMIN. Engr., M. of W., S. P. Co., Atlantic			
System, 1518 Crawford St., Houston, Tex .....		Nov.	1, 1893
CUSHING, WILLIAM CHANNING. Chf. Engr., M. of W., {	Jun.	June	5, 1889
Southwest System, Penn. Lines, Union Station, {	Assoc. M.	Nov.	4, 1891
Pittsburg, Pa .....	M.	May	1, 1901
CUTSHAW, WILFRED EMORY. City Engr., Richmond, Va.....		Mar.	4, 1891
DABNEY, AUGUSTINE LEE. Contr. Engr., 43½ Madison St., Room 18,			
Memphis, Tenn .....		Oct.	2, 1901
DANFORTH, FREDERIC. 29 Pleasant St., Gardiner, Me.....		Sept.	2, 1891
DARLING, JOHN HENRY. U. S. Prin. Asst. Engr., 532 West Third St.,			
Duluth, Minn.....		May	1, 1901
DARLING, WILLIAM LAFAYETTE. Chf. Engr., N. P. Ry. Co., St. Paul,			
Minn.....		Oct.	5, 1892
DARRACH, CHARLES GOBRECHT. Cons. Engr., Ridley Park, Pa. ....		Jan.	5, 1876
DART, JUSTUS VINTON. Chg. of Highway Dept., City Hall, Providence,			
R. I.....		April	4, 1900
DAVIES, JOHN VIPOND. Cons. Engr. (Jacobs & Davies), 128 Broad-			
way, New York City.....		June	6, 1894
DAVIS, ARTHUR POWELL. Prin. Engr., Arid Land Re-			
clamation Service, U. S. Geological Survey, Wash- {	Assoc. M.	June	7, 1893
ington, D. C. ....	M.	Oct.	4, 1899



## MEMBERS D

		Date of Membership.	
DAVIS, CHANDLER. 5 West 39th St., New York City.....	{ Jun.	Dec.	3, 1890
	{ Assoc. M.	Feb.	6, 1895
	{ M.	Oct.	4, 1899
DAVIS, CHARLES. County Engr., Allegheny Co., Pa., Court House, Pittsburgh, Pa. (Res., 912 Western Ave., Allegheny, Pa.).....		Sept.	15, 1869
DAVIS, CHARLES E. L. B. Lt.-Col., Corps of Engrs., U. S. A., Manila, Philippine Islands.....		July	12, 1877
DAVIS, CHARLES HENRY. Cons. Engr., 25 Broad St., New York City...		Dec.	4, 1895
DAVIS, CHESTER BIRGE. Cons. Engr., 10 Wall St., Suite 707, New York City.....		Feb.	1, 1882
DAVIS, JOSEPH BAKER. Prof. of Geodesy and Surv., Univ. of Mich., 731 S. Ingalls St., Ann Arbor, Mich.....	{ Jun.	April	1, 1874
	{ M.	Oct.	5, 1898
DAVIS, JOSEPH PHINEAS. Cons. Engr., 113 West 38th St., New York City.		Jan.	29, 1868
DAVIS, ROBERT BENJAMIN. Designing Engr., Bost. Elev. Ry. Co., 101 Milk St., Boston, Mass.....		July	3, 1889
DAVISON, GEORGE STEWART. (Director). Cons. Engr., 514 Smithfield St., Pittsburg, Pa.....		April	2, 1890
DAWLEY, EDWIN PELEG. Div. Engr., N. Y., N. H. & H. R. R., South Terminal Station, Boston, Mass.....		April	1, 1885
DEAN, LUTHER. Taunton, Mass.....		May	4, 1898
DEANS, JOHN STERLING. Chf. Engr., The Phoenix Bridge Co., Phoenixville, Pa.....		May	4, 1887
DEEN, JAMES WORK. Div. Engr., D. & R. G. R. R., Salida, Colo.....		Jan.	6, 1892
DEFREES, MORRIS M. 62 Ingalls Bldg., Indianapolis, Ind. ....		Mar.	3, 1880
DE FUNIAK, FREDERICK. Cons. and R. R. Engr., 204 Chestnut St., Louisville, Ky.....		May	7, 1873
DE LA BARRE, WILLIAM. Engr. Agt. and Treas., St. Anthony Falls Water Power Co., Minneapolis, Minn.....		April	5, 1893
DELANO, FREDERIC ADRIAN. Gen. Mgr., C., B. & Q. R. R., 209 Adams St., Chicago, Ill.....		June	4, 1902
DENNIS, ARTHUR CRISFIELD. Clarksburg, W. Va.....		Dec.	4, 1901
DENNIS, WILLIAM FRANKLIN. Contr. (Rinehart & Dennis Co.), Parkersburg, W. Va.....		Feb.	1, 1888
DERBY, GEORGE McCLELLAN. Maj., Corps of Engrs., U. S. A., Custom House, Louisville, Ky.....		April	1, 1896
DERRICK, HENRY CLAY. Houston, Halifax Co., Va.....		Oct.	5, 1887
DE VARONA, IGNACIO MARÉA. Chf. Engr., Dept. of Water Supply, Gas and Electricity, Borough of Brooklyn, Municipal Bldg., Brooklyn, N. Y.....		April	7, 1886
DEVIN, GEORGE. 1 Newark St., Hoboken, N. J.....		Sept.	7, 1887
DEWITT, PHILIP HOFFECKER. 8 Arlington Road, Cranford, N. J.....		May	5, 1897
DEYO, SOLOMON LEFEVRE. Chf. Engr., Interborough Rap. Trans. Co., 12 East 119th St., New York City.....		June	6, 1888
DIDIER, PAUL. Asst. Chf. Engr., B. & O. R. R. Co., Allegheny City, Pa.....		Mar.	6, 1889
DIEBITSCH, EMIL. With John Peirce, 277 Broadway, New York City.....	{ Jun.	Feb.	28, 1893
	{ Assoc. M.	Oct.	6, 1897
	{ M.	Mar.	5, 1902

## MEMBERS D-E

Date of Membership

DILLMAN, GEORGE LINCOLN. 722 Montgomery St., San Francisco, Cal.....	Mar. 4, 1891
D'INVILLIERS, CAMILLE STANISLAUS. 1411 Sixth Ave., Altoona, Pa.....	Jan. 4, 1888
DOANE, WALTER A. City Civ. Engr., Meadville, Pa.....	Sept. 7, 1881
DONOVAN, CORNELIUS. U. S. Asst. Engr., Custom House, New Orleans, La.....	Oct. 4, 1899
DONOVAN, JOHN JOSEPH. Gen. Supt. and Chf. Engr., Bellingham Bay & British Columbia R. R. Co.; Gen. Supt., Blue Canyon Coal Min. Co., Whitcomb, Wash.....	Jun. April 7, 1886 M. April 4, 1888
DOREMUS, ABRAHAM FAIRBANKS. State Engr., Room 601, McCornick Bldg., Salt Lake City, Utah.....	Oct. 4, 1893
DORR, EDGAR SUTTON. Chf. Engr., Sewer Div., Street Dept., Boston, Mass.....	April 3, 1895
DOUGLAS, BENJAMIN. Bridge Engr., Mich. Cent. R. R., Detroit, Mich.....	Jun. June 1, 1887 M. Jan. 2, 1890
DOUGLAS, EDWARD MOREHOUSE. Care, U. S. Geological Survey, Washington, D. C.....	Dec. 4, 1901
DRAKE, ALBERT BAILEY. 164 William St., New Bedford, Mass.....	Oct. 4, 1893
DRAKE, WILLIAM ABIAL. Gen. Supt. and Chf. Engr., S. F., P. & P. Ry. Co., Prescott, Ariz.....	Dec. 5, 1883
Du Bois, AUGUSTUS JAY. Prof. of Civ. Eng., Sheffield Scientific School, New Haven, Conn.....	Jun. July 7, 1875 M. Oct. 5, 1892
DUDLEY, CHARLES BENJAMIN. Chemist, P. R. R. Co., Drawer 156, Altoona, Pa.....	Mar. 2, 1892
DUGGAN, GEORGE HERRICK. Asst. to Pres., Dominion Iron & Steel Co., Dominion Coal Co., Sydney, N. S., Canada.....	Oct. 2, 1895
DUN, JAMES. Chf. Engr., A., T. & S. F. Ry. System, Room 1602, Great Northern Bldg., Chicago, Ill.....	June 7, 1876
DUNCKLEE, JOHN BUTLER. Supt., Tenement House Dept., 2806 Third Ave., New York City.....	April 2, 1873
DUNHAM, CHARLES FREDERICK. Care, James Owen, Montclair, N. J....	April 2, 1902
DUNHAM, HERBERT FRANKLIN. 220 Broadway, New York City.....	Oct. 1, 1890
DUNLAP, DE CLERMONT. 5535 Monroe Ave., Chicago, Ill.....	Jan. 4, 1888
DUNN, DANIEL BURKE. Div. Engr., Constr. of East & West R. R., Dallas, Ga.....	Dec. 2, 1891
DURYEA, EDWIN, JR. Chf. Engr., Bay Cities Water Co., Mutual Savings Bank Bldg., San Francisco, Cal....	Jun. Feb. 2, 1887 Assoc. M. Sept. 4, 1895 M. Feb. 2, 1898
DYER, ARTHUR JAMES. Engr. in Chg., Great Falls Power Co., Nashville, Tenn.....	Assoc. M. Mar. 6, 1901 M. Feb. 4, 1903
EAGLE, GEORGE GOODSELL. Chf. Engr. and Gen. Supt., Sewerage and Water Board, New Orleans, La.....	Jun. May 7, 1890 Assoc. M. Dec. 2, 1891 M. April 4, 1894
EARLEY, JOHN EDWIN. Calle Ortega No. 28, City of Mexico, Mexico..	April 5, 1876
EASBY, MARMADUKE WARD. Cons. and Const. Engr., 1420 Chestnut St., Room 909, Philadelphia, Pa.....	Assoc. M. Nov. 4, 1891 M. Dec. 1, 1897
EATON, FREDERICK. California Bank Bldg., Los Angeles, Cal.....	May 5, 1886

## MEMBERS E

		Date of Membership	
ECKART, WILLIAM ROBERTS.	Cons. Engr., Room 4, Nevada Bldg., San Francisco, Cal.	Jan.	5, 1881
ECKERT, EDWARD WILLIAM.	452 West 153d St., New York City	Feb.	3, 1886
EDES, WILLIAM CUSHING.	Asst. Engr., S. P. Co., 4 Montgomery St., San Francisco, Cal.	Jun. 1, 1886	Sept. 1, 1886
EDWARDS, HARRY WINTER.	1815 Downing Ave., Denver, Colo.	June	4, 1890
EDWARDS, JAMES HARVEY.	Asst. Chf. Engr., Am. Bridge Co., Oxford, N. Y.	Jun. 31, 1892	May 2, 1891
		Assoc. M.	May 4, 1898
EDWARDS, NATHANIEL MARSH.	Civ. and Hydr. Engr., 814 College Ave., Appleton, Wis.	June	3, 1874
EIDLITZ, OTTO MARC.	Builder, 489 Fifth Ave., New York City	Sept.	2, 1902
ELDRIDGE, ARCHIBALD RONALDSON.	Office of Chf. Engr., C., B. & Q. Ry., 209 Adams St., Chicago, Ill.	Oct.	2, 1901
ELDRIDGE, GRIFFITH MORGAN.	Mgr., Eldridge Drug Stores, Americus, Ga.	June 1, 1892	Sept. 3, 1902
ELLIOTT, CHARLES GLEASON.	Expert in Chg. of Drainage Investigations, Dept. of Agriculture, Washington, D. C.	Sept.	3, 1890
ELLIS, GEORGE EZRA.	Signal Engr. and Western Agt., Pneumatic Signal Co., 1032 Monadnock Blk., Chicago, Ill.	Jun. 2, 1897	Mar. 7, 1900
		Assoc. M.	Dec. 4, 1901
ELLIS, JOHN WALDO.	Cons. Engr., Woonsocket, R. I.	July	3, 1895
ELLIS, SAMUEL CLARENCE.	1750 Beacon St., Brookline, Mass.	Aug.	7, 1872
ELMER, HOWARD NIXON.	Mgr., Chicago Office, The Trenton Iron Co., 1114 Monadnock Blk., Chicago, Ill.	April	7, 1886
ELWELL, CHARLES CLEMENT.	Supt. of the Norwich Div., N. Y., N. H. & H. R. R., Norwich, Conn.	July	1, 1891
ELY, THEODORE NEWEL.	Broad St. Station, Philadelphia, Pa.	Mar.	2, 1881
EMERY, JAMES ALBERT.	Mgr. of Constr. (for Ford, Bacon & Davis), Birmingham Ry., Light & Power Co., Birmingham, Ala.	June	4, 1902
EMIGH, JOHN H.	North Adams, Mass.	April	3, 1901
ENDICOTT, MORDECAI THOMAS.	(Director). Rear-Admiral and Civ. Engr., U. S. N.; Chf. of Bureau of Yards and Docks, U. S. Navy Dept., Washington, D. C.	April	4, 1877
ENGLE, ROBERT L.	1530 Westminster Ave., Cincinnati, Ohio.	Sept.	7, 1881
ERICSON, JOHN ERNST.	City Engr. of Chicago, Ill.; Res., 1914 Arlington Pl., Chicago, Ill.	May	7, 1902
ERLANDSEN, OSCAR.	Asst. Engr., Dept. of Bridges, Park Row Bldg., New York City	Jun. 1, 1889	May 2, 1891
		Assoc. M.	Oct. 7, 1896
ERNST, OSWALD HERBERT.	Lt.-Col., Corps of Engrs., U. S. A., 1637 Indiana Ave., Chicago, Ill.	July	4, 1888
EVANS, GEORGE EDWIN.	Civ. and Hydr. Engr., 95 Milk St., Boston, Mass.	May	2, 1888
EVANS, LOUIS HYDE.	Contr. Engr., 7 East 42d St., New York City	July	3, 1889
EVANS, RICHARD.	Room 1, Town Hall, Jamaica, Queens Co., N. Y.	June	7, 1893
EWING, WILLIAM BION.	City Engr., La Grange, Ill.	Jun. 3, 1889	Feb. 3, 1892
		Assoc. M.	Nov. 2, 1898

## MEMBERS F

	Date of Membership.
FAIRLEIGH, JAMES ANDREW. With Western Cement Co., Louisville, Ky. ....	Sept. 2, 1891
FANNING, JOHN THOMAS. Cons. Engr., 330 Hennepin Ave., Minneapolis, Minn. ....	Aug. 7, 1872
FARLEY, GODFREY PEARSON. Vice-Pres., Wiscasset, Waterville & Farmington R. R., Wiscasset, Me., also 100 Broadway, New York City .....	June 6, 1900
FARLEY, JOHN MOYER. Cons. Engr., White Plains, N. Y. . . . .	<div> <div>Jun.</div> <div>Dec. 5, 1888</div> </div>
	<div> <div>Assoc. M.</div> <div>July 1, 1891</div> </div>
	<div> <div>M.</div> <div>Sept. 1, 1897</div> </div>
FARNUM, HENRY HARRISON. 324 East 150th St., New York City .....	July 1, 1891
FARRAR, HARTWELL PRENTICE. Civ. Engr., M. & O. R. R., Jackson, Tenn. ....	Nov. 1, 1893
FARRINGTON, HARVEY. Cons. Engr., 115 Broadway, New York City .....	<div> <div>Jun.</div> <div>June 19, 1891</div> </div>
	<div> <div>Assoc. M.</div> <div>Feb. 6, 1895</div> </div>
	<div> <div>M.</div> <div>Oct. 1, 1902</div> </div>
FEHR, HARRISON ROBERT. Miles-Fehr Contr. Co., Drake Bldg., Easton, Pa. ....	Oct. 5, 1898
FELT, CHARLES FREDERICK WILSON. Chf. Engr., Gulf, Colo. & S. F. Ry., Galveston, Tex. ....	Mar. 3, 1897
FELTON, BURTON ROGERS. Treas., C. E. Trumbull Co., 112 Tremont Bldg., Boston, Mass. ....	<div> <div>Assoc. M.</div> <div>April 4, 1894</div> </div>
	<div> <div>M.</div> <div>Oct. 7, 1896</div> </div>
FELTON, HERBERT CLARK. Supt., Del. River Ferry Co. of N. J. of P. & R. Ry. System, Camden, N. J. ....	June 1, 1887
FELTON, SAMUEL MORSE. Pres., Chic. & Alton Ry. Co., Chicago, Ill. .	Jan. 4, 1882
FENDALL, BENJAMIN TRUMAN. City Engr. (128 West La Fayette Ave.), Baltimore, Md. ....	May 7, 1902
FERGUSON, GEORGE ROBERT. Asst. Engr., Dept. of Bridges, 1215 Park Row Bldg., New York City .....	Dec. 3, 1902
FERGUSON, HARDY SMITH. Chf. Engr., Great Northern Paper Co., Millinocket, Me. ....	<div> <div>Assoc. M.</div> <div>Mar. 3, 1897</div> </div>
	<div> <div>M.</div> <div>May 1, 1901</div> </div>
FERGUSON, JOHN WILLIAM. Builder and Gen. Contr., 253 Broadway, New York City .....	<div> <div>Jun.</div> <div>Jan. 5, 1881</div> </div>
	<div> <div>M.</div> <div>Feb. 2, 1887</div> </div>
FERNSTROM, HENNING. Asst. Chf. Engr., N. Y. C. & H. R. R. R., Room 521, Grand Central Station, New York City .....	May 7, 1902
FERRY, CHARLES ADDISON. With A. B. Hill, Cons. Civ. Engr., 82 Church St., New Haven, Conn. ....	<div> <div>Jun.</div> <div>May 4, 1881</div> </div>
	<div> <div>M.</div> <div>Jan. 2, 1889</div> </div>
FIEBEGGER, GUSTAVE JOSEPH. Prof. of Eng., West Point, N. Y. ....	Oct. 2, 1895
FIELD, GEORGE SPENCER. 452 Delaware Ave., Buffalo, N. Y. ....	April 7, 1880
FIELD, WILLIAM PIERSON. 976 Broad St., Newark, N. J. ....	<div> <div>Jun.</div> <div>Dec. 7, 1887</div> </div>
	<div> <div>M.</div> <div>Mar. 6, 1901</div> </div>
FIELDS, SAMUEL JAMES. 937 Maryville Ave., St. Louis, Mo. ....	Mar. 5, 1884
FILLEY, HIEL HAMILTON. Res. Mgr. and Chf. Engr., The Guanajuato Power & Electric Co., Zamora, Michoacan, Mexico. ....	Jan. 3, 1883
FINE, RUDOLPH. Rural Free Delivery, Route No. 4, Louisville, Ky. .	Sept. 21, 1870
FIRMSTONE, FRANK. Easton, Pa. ....	Aug. 7, 1878
FISHER, CLARK. Civ. and Mech. Engr., Trenton, N. J. ....	Oct. 19, 1870
FISHER, EDWIN AUGUSTUS. City Engr., 16 Reynolds St., Rochester, N. Y.	July 4, 1888



## MEMBERS F

		Date of Membership.
FISHER, ELSTNER. Gen. Supt. and Chf. Engr., Toronto,	Jun.	April 3, 1889
Hamilton & Buffalo Ry. Co., Hamilton, Ont.,	Assoc. M.	June 2, 1897
Canada.....	M.	Mar. 3, 1902
FISHER, FRANCIS DAVIS. Engr., The Degnon-McLean Contr. Co.,		
Rapid Transit Subway, Worth and Elm Sts., New York City..		May 2, 1888
FISHER, JANON. Ruxton, Md.....	Assoc. M.	May 4, 1892
	M.	Jun. 5, 1898
FISK, WALTER LESLIE. Maj., Corps of Engrs., U. S. A., 33 Campau		
Bldg., Detroit, Mich.....		April 1, 1896
FITCH, ASA BETTS. Lessee, Graphic Mines & Smelting Works, Mag-		
dalena, N. Mex.....		Mar. 5, 1884
FITCH, CHARLES HALL. Topographer, U. S. Geological Survey, 3062		
Q St., N. W., Washington, D. C.....		June 5, 1901
FITCH, CHARLES LINCOLN. 253 Throop Ave., Brooklyn, N. Y.....		Oct. 2, 1901
N. FITZGERALD, DESMOND. ( <i>Past-President</i> ). Cons. Engr., Brook-		
line, Mass.....		Sept. 3, 1884
FITZGERALD, JOHN LELAND. Cons. Engr., 175 Jay St., Schenectady,		
N. Y.....		Jan. 2, 1889
FLAD, EDWARD. Water Commr., City Hall, St. Louis, Mo.....	Jun.	Jan. 7, 1885
	M.	Feb. 1, 1888
FLAGG, JOSIAH FOSTER. Plaza Hotel, Las Vegas, N. Mex.....		Oct. 7, 1874
FLEMING, Sir SANDFORD. Cons. Engr., Ottawa, Ont., Canada.....		Sept. 18, 1872
FOLLETT, WILLIAM W. U. S. Cons. Engr., International Boundary		
Comm., United States and Mexico, El Paso, Tex.....		July 5, 1893
FOLWELL, AMORY PRESCOTT. Hydr. and Municipal Engr.,	Jun.	Feb. 5, 1890
Easton, Pa.....	Assoc. M.	June 7, 1893
	M.	Nov. 3, 1897
FOOTE, ARTHUR DEWINT. Supt., North Star Mines Co., Grass Valley,		
Cal.....		May 7, 1884
FORCE, CYRUS GILDERSLEEVE. Cons. Civ. Engr., Flanders, Morris		
Co., N. J.....		Feb. 6, 1878
FORSYTH, ROBERT. Cons. Engr., 1143 The Rookery, Chicago, Ill.....		May 12, 1875
FOSTER, WILBUR FISK. Engr. and Contr., 3 Berry Blk., Nashville,		
Tenn.....		May 7, 1873
FOUQUET, JOHN DOUGLAS. Draftsman, Archt. Dept., Room 505, Grand		
Central Station, N. Y. C. & H. R. R. R., New York City.....		June 3, 1885
FOWLER, CHARLES EVAN. Pres. and Chf. Engr., Puget Jun.		May 7, 1890
Sound Bridge & Dredging Co., Scandinavian-Ameri-	Assoc. M.	Dec. 5, 1893
can Bank Bldg., Seattle, Wash.....	M.	May 3, 1898
FOX, STEPHENSON WATERS. U. S. Asst. Engr., Sioux City, Iowa.	Jun.	July 7, 1880
	M.	Oct. 6, 1886
FRANCIS, CHARLES. 8 Masonic Temple, Davenport, Iowa.....		May 4, 1892
FRANCIS, GEORGE BLINN. Civ. Engr., Westinghouse Church	Jun.	Sept. 5, 1883
Kerr & Co., 8 Bridge St., New York City.....	M.	Nov. 7, 1888
FRANCIS, HENRY NEWTON. Arlington, R. I.....	Jun.	Mar. 1, 1876
	M.	Nov. 7, 1888
FRANK, GEORGE WILLIAM. Engr. in Chg., Yadkin River Hydr. De-		
velopment, New London, N. C.....		Feb. 1, 1899



## MEMBERS F-G

		Date of Membership.	
FRANKLIN, WILLIAM BUEL.	144 Washington St., Hartford, Conn....	April	1, 1874
FRAZIER, HARRY.	Cons. Engr., Seaboard Air Line Ry., Staunton, Va.	May	1, 1889
FRAZIER, JAMES LEWIS. ( <i>Director</i> ).	Gen. Supt., Tol., St. L. & West. R. R., Frankfort, Ind.....	Sept.	1, 1880
N. FREEMAN, JOHN RIPLEY. ( <i>Vice-President</i> ).	Consulting {		
	Engineer; also Pres. and Treas., Mfrs.' Rhode Island and Mechanics' Insurance Cos., 812 Banigan Bldg., Providence, R. I. ....	Jun.	June 7, 1882
		M.	April 3, 1889
FRENCH, ALEXIS HENRY.	Town Engr., Town Hill, Brookline, Mass.; also of firm of French & Bryant, 334 Washington St., Brookline, Mass., and 4 State St., Boston, Mass.....	June	6, 1894
FRENCH, ALFRED WILLARD.	Pres., The French Oil Mill Machinery Co., Piqua, Ohio.....	May	2, 1900
FRENCH, JAMES BENTON.	Bridge Engr., Atlantic Ave. {	Jun.	Feb. 6, 1889
	Impvt., Long Island R. R., 44 Court St., Brooklyn, N. Y. ....	Assoc. M.	Feb. 7, 1894
		M.	Nov. 2, 1898
FREW, ARCHIBALD SMITH.	Chf. Engr., Chillagoe Ry. & Mines Co., Ltd., Mareeba, Queensland, Australia.....	Oct.	3, 1900
FREYHOLD, FELIX.	236 First St., S. E., Washington, D. C. {	Assoc. M.	Sept. 2, 1891
		M.	April 2, 1902
FRINK, ELLIS ALEXANDER.	(Frink & Hazen, Cons. and Contr. Edgers.), 711 Union Trust Bldg. (Res., 2326 Guilford Ave.), Baltimore, Md.....	Assoc. M.	June 6, 1900
		M.	Dec. 4, 1901
FRITCH, LOUIS CHARLTON.	Supt., B. & O. S. W. Ry., Miss. Div., Washington, Ind.....	Oct.	3, 1900
FRITZ, JOHN.	Bethlehem, Pa. ....	M.	July 5, 1893
		Hon. M.	Sept. 5, 1899
FRIZELL, JOSEPH PALMER.	Civ. and Hydr. Engr., 60 Congress St., Boston, Mass.....	Jan.	3, 1883
FRYE, ALBERT IRWIN.	426 Jefferson Ave., Elizabeth, N. J.....	Dec.	2, 1896
N. FTELEY, ALPHONSE. ( <i>Past-President</i> ).	Civ. and Hydr. Engr., 14 West 131st St., New York City.....	Jan.	5, 1876
FUERTES, JAMES HILLHOUSE.	Civ. and San. Engr., 140 Nassau St., New York City.....	Jun.	May 2, 1888
		M.	Feb. 6, 1895
FULLER, FRANK LOUIS.	12 Pearl St., Boston, Mass.....	Jun.	April 4, 1883
		M.	April 4, 1888
FULLER, FRANKLIN IDE.	Gen. Mgr., Portland Ry. Co., cor. First and Washington Sts., Portland, Ore.....	Jan.	6, 1886
FULLER, WILLIAM BARNARD.	Res. Engr., Jersey City Water Supply Co., 170 Broadway, New York City.....	Jun.	June 3, 1885
		M.	May 1, 1895
FULTON, JOHN ADDISON.	401 Western Union Bldg., Chicago, Ill.....	May	4, 1887
FURBER, WILLIAM COPELAND.	Arch. and Cons. Engr., 421 Chestnut St., Room 504, Philadelphia, Pa.....	May	2, 1899
GADSDEN, GEORGE MORRALL.	Director of Public Works, Savannah, Ga..	May	4, 1898
GAHAGAN, WALTER HAMER.	189 Montague St., Brooklyn, N. Y. ....	Jun.	Sept. 5, 1888
		Assoc. M.	July 1, 1891
		M.	April 3, 1901

## MEMBERS G

	Date of Membership.
GAMBLE, FRANCIS CLARKE. Public Works Engr. and Insp. of Dykes, British Columbia, Victoria, B. C., Canada.....	April 1, 1891
GARDINER, EDMUND LEBRETON. Ridgewood, N. J.....	June 7, 1882
GARDNER, GEORGE CLINTON. Beech St., Richmond Hill, Queen's Bor- ough, New York City.....	Nov. 3, 1875
GARDNER, MARTIN LUTHER. Asst. Engr., P. R. R. Co., { Assoc. M. Jersey City, N. J. (Res., 58 Elizabeth Ave., Newark, { M. N. J.).....	Sept. 2, 1891 Mar. 4, 1896
GARRISON, EVERETT. City Engr., City Hall, Newburgh, N. Y. ....	Mar. 7, 1894
GATCHELL, GEORGE SAMUEL. Mgr., Buffalo Elevating Co., 68 Board of Trade, Buffalo, N. Y.....	May 7, 1884
GATES, CHRISTOPHER LAWRENCE. Cons. Engr., 416 Irving St., { Jun. Toledo, Ohio..... } M. Sept. 5, 1883	Dec. 4, 1878
GATES, HORACE DELPHOS. Asst. Engr., 311 Lyon St., San Francisco, Cal.....	Mar. 7, 1883
GAY, CHARLES WEBSTER. 25 Exchange St., Lynn, Mass.....	May 6, 1891
GAY, MARTIN. Asst. Engr., Dept. of Bridges, 13 Park Row, { Jun. New York City..... } M. June 5, 1889	June 4, 1884
GAYLER, CARL. Bridge Engr., Street Dept., City Hall, St. Louis, Mo. Sept. 3, 1884	Sept. 3, 1884
GAYOL, ROBERTO. Chf. Engr. and Director of the Drainage of the City of Mexico; Mem. of Board of Health; Chf. Engr., Rio-Frio Ry., City of Mexico, Mexico.....	Mar. 2, 1892
GEDDES, EDMUND BURNS. U. S. Asst. Engr., Natchez, Miss.....	Mar. 2, 1898
GEDDES, JAMES KENNON. Receiver and Gen. Mgr., B., Z. & C. Ry. Co., Zanesville, Ohio.....	Jan. 2, 1890
GEER, HARVEY MOSHER. Ballston, N. Y.....	June 6, 1894
GEMMELL, ROBERT CAMPBELL. Civ. and Min. Engr., { Assoc. M. Mazapil, Zac., Mexico..... } M. Dec. 4, 1895	Oct. 5, 1892
GEBBER, EMIL. Asst. to Pres., Am. Bridge Co., N. W. cor. 15th and Chestnut Sts., Philadelphia, Pa.....	Feb. 1, 1888
GERIG, WILLIAM. U. S. Asst. Engr., Lock Box 217, Memphis, Tenn...	Mar. 5, 1902
GERRY, MARTIN HUGHES, JR. Chf. Engr. and Gen. Mgr., { Assoc. M. Missouri River Power Co., Helena, Mont..... } M. Dec. 3, 1902	June 6, 1900
GIBBS, CHARLES WINGATE. Civ. and Min. Engr., Telluride, Colo.....	Jan. 2, 1889
GIBBS, GEORGE. Cons. Engr., Interborough Rap. Trans. Co.; Mem., Board of Engrs., Penn., N. Y. & L. I. Ry.; First Vice-Pres., West- inghouse, Church, Kerr & Co., Park Row Bldg., New York City...	Mar. 6, 1895
GIFFORD, GEORGE EDWIN. Eastern Representative, The { Assoc. M. King Bridge Co., 120 Liberty St., New York City... } M. Jan. 1, 1896	Oct. 7, 1891
GILES, ROBERT. (Giles & Harris). San Juan, Porto Rico.....	May 6, 1891
GILLETTE, EDWARD. Supt., Sheridan Div., B. & M. R. R. R., Sheri- dan, Wyo.....	July 3, 1889
GILLETTE, LEWIS SINGER. Pres., Elec. Steel Elevator Co., Minne- apolis, Minn.....	June 7, 1899
GLADDING, HENRY HOLBROOK. Asst. City Engr., 30 Stanley St., { Jun. New Haven, Conn..... } M. Jan. 4, 1888	July 1, 1885
GLASGOW, ARTHUR GRAHAM. (Humphreys & Glasgow), 38 Victoria St., Westminster, London, England.....	Jan. 3, 1900

## MEMBERS G

	Date of Membership.
GOAD, CHARLES EDWARD. 15 Wellington St., West, Toronto, Ont., Canada (also 185 St. James St., Montreal, Que., Canada, and 53 New Broad St., London, E. C., England).....	Sept. 7, 1881
GOING, ALVAH SEYMOUR. Hillside Ave. and Cook St., Victoria, B. C., Canada.....	May 4, 1892
	June 7, 1899
R. GOLDMARK, HENRY. Engr. in Chg., New Shops, Canadian Pacific Ry., Montreal, Que., Canada.....	May 7, 1884
	June 6, 1888
GOODALE, LOOMIS FARRINGTON. Chf. Engr., Missouri Lines of C., B. & Q. Ry. System, Room 610, Globe Democrat Bldg., St. Louis, Mo.....	Nov. 7, 1900
GOODNOUGH, XANTHUS HENRY. Chf. Engr., State Board of Health, Room 140, State House, Boston, Mass.....	May 6, 1896
	June 4, 1902
GOODRICH, WILBUR FRANCIS. 10 Gibbens St., Somerville, Mass.....	May 4, 1887
GOTSHALL, WILLIAM CHARLES. 76 William St., New York City.....	May 7, 1902
GOULD, EDWARD SHERMAN. Cons. Engr., Yonkers, N. Y.....	Nov. 4, 1885
GOULD, WILLIAM TILLOTSON. Chf. Engr.'s Office, Brooklyn Heights R. R. Co., Franklin Trust Bldg., Brooklyn, N. Y.....	Jan. 2, 1890
GOWEN, CHARLES SEWALL. Engr., New Croton Dam, Ossining, N. Y.....	Mar. 7, 1888
GRAFTON, CHARLES EDWIN. Asst. Engr., B. & O. R. R., Central Bldg., Baltimore, Md.....	Jan. 1, 1896
GRAHAM, CHARLES HALLETT. Engr. in Chg. of Sewers, Borough of the Bronx, 177th St. and Third Ave., New York City.....	Sept. 7, 1887
GRAHAM, JOSEPH MARSHALL. Chf. Engr., B. & O. R. R., Baltimore, Md.....	April 4, 1900
GRANT, EMERSON WARREN. Eng. Dept., A., T. & S. F. Ry., 1014 West 13th St., Topeka, Kans.....	Dec. 4, 1889
GRANT, JUSTUS HERBERT. Commr. of Public Works, City Hall, Rochester, N. Y.....	Mar. 2, 1892
GRANTHAM, HERBERT THOMAS. Chf. Engr., Belmont Iron Works, 1622 Real Estate Trust Bldg., Philadelphia, Pa.....	Assoc. M. Feb. 5, 1896
	M. May 7, 1902
GRAVES, EDWIN DWIGHT. Chf. Engr., Conn. River Bridge and Highway Dist. Comm., 650 Main St., Hartford, Conn.....	Assoc. M. Jan. 2, 1895
	M. Dec. 2, 1896
GRAY, GEORGE EDWARD. Cons. Engr., 1155 Bush St., San Francisco, Cal.....	M. July 2, 1873
	Hon. M. June 5, 1894
GRAY, JOHN HENRY. Watkins, N. Y.....	Oct. 2, 1895
GRAY, SAMUEL MERRILL. Cons. Engr., Room 929, Banigan Bldg., Providence, R. I.....	May 15, 1872
GREEN, BERNARD LINCOLN. Secy., The Osborn Eng. Co., Osborn Bldg., Cleveland, Ohio.....	April 3, 1901
GREEN, BERNARD RICHARDSON. Supt., Building and Grounds, Library of Congress, Washington, D. C.....	Oct. 2, 1889
GREENE, BENJAMIN DWIGHT. Stamford, Conn.....	Nov. 4, 1885
GREENE, CHARLES EZRA. Prof. of Civ. Eng. and Dean, Dept. of Eng., Univ. of Michigan, Ann Arbor, Mich.....	Jan. 4, 1882
GREENE, DAVID MANSON. Cons. Engr., 41 First St., Troy, N. Y.....	May 20, 1868
GREENE, EDWARD APPLETON. 205 Moxahala Ave., Zanesville, Ohio.....	July 4, 1888
GREENE, FRANCIS VINTON. Police Commr., New York City.....	June 3, 1885

## MEMBERS G H

		Date of Membership.	
GREENE, GEORGE SEARS, Jr.	Cons. Engr., 11 Broadway, New York City.....	Dec.	4, 1867
GREENE, JOSEPH NORTON.	The Quincy, Boston, Mass.....	Oct.	5, 1887
N. GREINER, JOHN EDWIN.	Engr., Bridges and Bldgs., B. & O. R. R., Mt. Royal Station, Baltimore, Md.....	June	4, 1899
GRESHAM, ROBERT HALL.	Engr. for Pan Handle & Gulf Ry., San Angelo, Tex.....	May	4, 1898
GRIFFIN, EUGENE.	Gen. Elec. Co., 44 Broad St., New York City.....	June	7, 1899
GRIGGS, JULIAN.	Chf. Engr., Dept. of Public Impvts., Columbus, Ohio.....	Oct.	4, 1899
GRIMM, CARL ROBERT.	131 Carnegie Hall, New York City.....	June	4, 1899
GRIMSHAW, JAMES WALTER.	Australian Club, Sydney, New South Wales, Australia.....	Nov.	7, 1888
GRUNSKY, CARL EWALD.	City Engr., San Francisco, Cal.....	Oct.	5, 1898
GUILD, JOSEPHUS CONN.	Chattanooga, Tenn.....	June	1, 1898
GUNNELL, WILLIAM COVINGTON.	600 Twentieth St., N. W., Washington, D. C.....	Feb.	7, 1877
GUPPY, BENJAMIN WILDER.	Bridge Engr., Maine Cent. R. R., Portland, Me.....	Jun.	June 19, 1891
		Assoc. M.	Oct. 3, 1894
		M.	Feb. 6, 1901
GUTHRIE, EDWARD BUCKINGHAM.	Chf. Engr., Grade Crossing Comm. (Res., 158 North Pearl St.), Buffalo, N. Y.....	Assoc. M.	Sept. 3, 1884
		M.	Oct. 5, 1887
HAGUE, CHARLES ARTHUR.	Cons. Engr., 114 Liberty St., New York City.	Feb.	3, 1892
HAIGHT, STEPHEN SAMUEL.	Civ. Engr. and City Surv., 2016 Boston Road, West Farms Sq. (Res., 976 East 179th St.), New York City.	June	1, 1881
HAINES, CASPAR WISTAR.	Engr., Washington-Southern Ry. and Mexican Vice-Consul, 26 South 15th St., Philadelphia, Pa. }	Jun.	Feb. 2, 1876
		M.	Oct. 7, 1891
HAINES, HENRY STEVENS.	The Engineers' Club, 374 Fifth Ave., New York City.....	Nov.	2, 1887
HAINS, PETER CONOVER.	Col., Corps of Engrs., U. S. A., 812 St. Paul St., Baltimore, Md.....	April	2, 1890
HALE, RICHARD AUGUSTUS.	Prin. Asst. Engr., Essex Co., Lawrence, Mass.....	Jun.	Feb. 6, 1884
		M.	July 1, 1891
HALL, BENJAMIN MORTIMER.	409 Temple Court (Res., 190 Forrest Ave.), Atlanta, Ga.....	Feb.	6, 1901
HALL, HENRY ARTHUR.	Asst. Engr., Met. Park Comm., 14 Beacon St., Boston, Mass.....	May	7, 1902
HALL, JULIEN ASTIN.	Cons. Engr., Bachelor's Hall, Va.....	June	5, 1889
N. HALL, WILLIAM HAMMOND.	324 Haight St., San Francisco, Cal.....	Jan.	2, 1884
HALL, WILLIAM McLAURINE.	Citizens Guaranty Bldg., Parkersburg, W. Va.....	Dec.	6, 1893
HAMBLETON, FRANCIS HENRY.	Cons. Engr., 8 South St., Baltimore, Md.....	Mar.	5, 1873
HAMILTON, WILLIAM GASTON.	105 East 21st St., New York City.....	Oct.	7, 1868
HAMLIN, GEORGE HERBERT.	Orono, Me.....	July	3, 1895
HAMMATT, EDWARD AUGUSTUS WHITE.	Civ. and Hydr. Engr., Hyde Park, Mass.....	June	5, 1901



## MEMBERS H

		Date of Membership.	
HANDY, EDWARD ADINO.	Chf. Engr., L. S. & M. S. Ry., L. E. & W. R. R., and I. T. & I. R. R., Cleveland, Ohio.	Jan.	2, 1889
HANNA, JOHN VENABLE.	Asst. Chf. Engr., Frisco System; Care, Frisco System, Room 505, Granite Bldg., St. Louis, Mo.	Assoc. M. { M. {	May 3, 1893 April 2, 1902
HANSEL, CHARLES.	Broad-Exchange Bldg., New York City.	Oct.	3, 1894
HARDEE, WILLIAM JOSEPH.	City Engr., Room 19, City Hall, New Orleans, La.	May	6, 1896
HARDING, GEORGE EDWARD.	Archit. and Civ. Engr., 253 Broadway, New York City.	Mar.	3, 1875
HARDING, HENRY.	Civ. and Hydr. Engr., Hartland (Fourcorners), Vt.	May	7, 1873
HARDY, GEORGE RICHARDSON.	Asst. Engr. of Constr., N. Y., N. H. & H. R. R., Forest Hills, Mass.	Nov.	7, 1888
HARING, JAMES SMITH.	Crafton, Allegheny Co., Pa.	Nov.	4, 1891
HARLEY, ALFRED FRANCIS.	127a Highbury New Park, London, Eng-land.	Dec.	7, 1898
HARLOW, GEORGE RICHARDSON.	620 Wood St., Wilksburg, Pa.	Nov.	1, 1899
HARLOW, JAMES HAYWARD.	Cons. Engr., James H. Harlow & Co., 701 Wood St., Wilksburg, Pa.; P. O. Address, Station D, Pittsburg, Pa.	Mar.	4, 1874
HARRINGTON, EPHRAIM.	Civ. and Cons. Engr., 60 State St., Boston, Mass.	Mar.	3, 1897
HARRIS, ELMO GOLIGHTLY.	Asst. Prof. of Civ. Eng., Univ. of Pennsylvania, Philadelphia, Pa.	Oct.	2, 1901
HARRIS, STEPHEN.	Asst. Engr., P. & R. Ry., Room 602, Reading Terminal, Philadelphia, Pa.	June	4, 1902
HARRISON, CHARLES LEWIS.	Prin. Asst. Engr., East River Section, P., N. Y. & L. I. R. R. Co., 225 W. 33d St., New York City.	Mar.	2, 1898
HARRISON, EDLOW WINGATE.	Cons. Engr.; Chf. Engr., Jersey City Water Supply Co., 15 Exchange Pl., Jersey City, N. J.	June	3, 1885
HARROD, BENJAMIN MORGAN.	(Past-President). Cotton Exchange, 4th Floor, New Orleans, La.	April	4, 1877
HARROUN, PHILIP EMBURY.	Hydr. and Irrig. Engr., Berkeley, Cal.	Mar.	7, 1900
HARTRICK, EDWARD MACAULAY.	U. S. Asst. Engr. in Chg., River and Harbor Impvts., Galveston, Tex.	Feb.	1, 1899
R. HARTIS, WILLIAM WRIGHT.	Capt., Corps of Engrs., U. S. { A., Cuartel de Malate, Manila, Philippine Islands.. {	Assoc. M. { M. {	Oct. 2, 1895 April 6, 1898
HASBROUCK, CHARLES ALFRED.	Asst. to Vice-Pres., Am. Bridge Co., 1315 Monadnock Bldg., Chicago, Ill.	Assoc. M. { M. {	Feb. 3, 1892 Dec. 5, 1894
HASIE, MONTAGUE SYLVESTER.	Contr. Mgr., Am. Bridge Co. of N. Y., Gaston Bldg., Dallas, Tex.	Feb.	3, 1897
HASKELL, EUGENE ELWIN.	Prin. Asst. Engr., U. S. Lake Survey, Campau Bldg., Detroit, Mich.	Sept.	7, 1898
HASLINS, WILLIAM JEWETT.	Cons. Engr. and Contr., 120 Liberty St., New York City.	Jun. { M. {	Mar. 7, 1883 Dec. 1, 1886
HASWELL, CHARLES HAYNES.	Cons. Civ. and Mech. Engr., 324 West 78th St., New York City.	Jan.	29, 1868



# MEMBERS H

Date of Membership.

<b>HATCH, FREDERICK THOMAS.</b>	Supt., Terre Haute & Logansport and Logansport & Toledo Rys., Logansport, Ind.....	Dec.	4, 1889
<b>HATTON, THOMAS CHALKLEY.</b>	Cons. Engr., Wilmington, Del.....	Mar.	6, 1895
<b>HAUPT, LEWIS MÜHLENBERG.</b>	Cons. Engr.; Pres., Reaction Jetty Co., 107 North 35th St., Philadelphia, Pa.....	June	6, 1888
<b>HAVEN, WILLIAM APPLETON.</b>	Inspecting Engr., Erie R. R., Room 10, Erie R. R. Depot, Buffalo, N. Y.....	Mar.	5, 1873
<b>HAVILAND, ARTHUR.</b>	Law Dept., N. Y. C. & H. R. R. Co., { Grand Central Station, New York City.....	Jun. Jan.	4, 1882
		M.	4, 1888
<b>HAWES, JAMES DUDLEY.</b>	Pres., Detroit & Mackinac Ry. Co., Detroit, Ypsilanti, Ann Arbor & Jackson Ry., Grand Rapids, Grand Haven & Muskegon Ry. Co., Lansing City Elec. Ry. Co., Detroit, Mich.....	Dec.	3, 1884
<b>HAWLEY, JOHN BLACKSTOCK.</b>	City Engr., Fort Worth, Tex. { Assoc. M. M.	May Oct.	1, 1895 5, 1898
<b>HAWLEY, WILLIAM CHAUNCEY.</b>	Chf. Engr. and Gen. Supt., { Pennsylvania Water Co., 701 Wood St., Wilkins- burg, Pa.....	Jun. Assoc. M. M.	Oct. 1, 1890 April 6, 1892 Dec. 3, 1902
<b>HAYDEN, WILLIAM WALLACE.</b>	Asst. Engr., G. & M. V. R. R., cor. Main and Madison Sts., Memphis, Tenn.....	Nov.	6, 1895
<b>HAYES, EDMUND.</b>	Ellicott Sq., Buffalo, N. Y..... { Jun. M.	April Mar.	3, 1878 5, 1884
<b>HAYES, EDWARD.</b>	Chf. Engr., Public Impvt. Comm., Cohoes, N. Y. . .	June	5, 1901
<b>HAYES, HENRY WILDE.</b>	Div. Engr., B. & M. R. R., { Boston, Mass.....	Assoc. M. M.	Mar. 2, 1898 May 1, 1901
<b>HAYES, RICHARD SOMERS.</b>	32 Nassau St. (Res., 30 East 51st St.), New York City .....	Sept.	6, 1882
<b>HAYES, STANLEY WOLCOTT.</b>	Engr. in Chg., R. A. & S. Ry. (for Westinghouse, Church, Kerr & Co.), Geneva, N. Y.....	June	6, 1900
<b>HAYS, JOHN WILLIS.</b>	3 South Adams St., Petersburg, Va.....	June	5, 1901
<b>HAYT, STEPHEN THURSTON, Jr.</b>	Supt. and Chf. Engr., Susq. & N. Y. R. R., Towanda, Pa.....	Mar.	3, 1897
<b>HAZARD, SCHUYLER.</b>	Chf. Engr., Catawba Power Co., Georgetown, S. C.	Oct.	5, 1898
<b>HAZELTON, CHARLES WILLIAM.</b>	Engr. and Treas., Turners Falls Co. (Water Power), Turners Falls, Mass.....	Jan.	7, 1891
<b>R. HAZEN, ALLEN.</b>	Cons. Engr., St. Paul Bldg., New York City..... { Assoc. M. M.	June Mar.	3, 1899 6, 1900
<b>HAZLEHURST, GEORGE BLAGDEN.</b>	Cons. Engr., 605 Los Angeles Trust Co. Bldg., Los Angeles, Cal. . . . .	Feb.	1, 1888
<b>HAZLEHURST, JAMES NISBET.</b>	Chf. Engr., Board of Public Works, Mobile, Ala.....	Oct.	4, 1899
<b>HEALD, SIMPSON CLARE.</b>	Rockwood St., Jamaica Plain, Mass.....	Nov.	4, 1885
<b>HEALY, JOHN FRANCIS.</b>	Chf. Engr., Davis Coal & Coke Co., { Thomas, W. Va.....	Jun. Assoc. M. M.	Jan. 2, 1890 June 3, 1891 Nov. 1, 1899
<b>HEDRICK, IRA GRANT.</b>	(Waddell & Hedrick, Cons. Engrs.), { 660 Gibraltar Bldg., Kansas City, Mo.....	Jun. Assoc. M. M.	Oct. 3, 1893 June 2, 1897 Nov. 7, 1900

# MEMBERS H

	Date of Membership.
HENDERER, WILLIAM OSWALD. Vice-Pres., The Osborn Eng. Co., Osborn Bldg., Cleveland, Ohio.....	April 3, 1901
HENDERSON, JOHN BAILLIE. Govt. Hydr. Engr., Brisbane, Queens- land, Australia.....	June 4, 1890
HENDRICK, CALVIN WHEELER. Div. Engr., Rapid Transit R. R. Comm., 13 Astor Pl. (Res., 220 Central Park South), New York City....	Nov. 7, 1900
HENNY, DAVID CHRISTIAAN. 204 Front St., San Francisco, Cal.....	Sept. 7, 1887
HENRY, DANIEL FARRAND. 52 Woodward Ave., Detroit, Mich.....	July 7, 1875
HEQUEMBOURG, CHARLES EZRA. 305 Central Ave., Dunkirk, N. Y....	June 5, 1901
HERBERT, ARTHUR POWIS. Engr. and Supt., Colima Div., Mex. National Constr. Co., Colima, Col., Mexico.....	Sept. 5, 1888
HERBERT, HARRY MONMOUTH. Cons. and Contr. Engr., Bound Brook, N. J.....	April 6, 1898
HERING, RUDOLPH. Hydr. and San. Engr., 170 Broadway, New York City.....	Jan. 5, 1876
HERMANN, EDWARD ADOLPH. Sewer Commr., City of St. Louis, Room 311, City Hall, St. Louis, Mo.....	April 6, 1887
HERMANY, CHARLES. Chf. Engr. and Supt., Louisville Water Co., 549 Third St., Louisville, Ky.....	Jan. 6, 1869
HERRICK, HENRY AUGUSTUS. Hydr. and Mill Engr., 242 Prospect St., Manchester, N. H.....	May 7, 1890
HERRON, JOHN. Mgr., The Tomboy Gold Mines Co., Ltd., Telluride, Colo.....	Oct. 4, 1893
R. HERSCHEL, CLEMENS. Hydr. Engr., 2 Wall St., New York City.....	April 21, 1869
HEUER, WILLIAM HENRY. Lt.-Col., Corps of Engrs., U. S. A., 41 Flood Bldg., San Francisco, Cal.....	Mar. 3, 1880
HEWITT, CHARLES EDWARD. Treas. and Gen. Mgr., The Trenton Iron Co., Trenton, N. J.....	Oct. 5, 1887
HICKOK, HENRY ADDISON. Mech. Engr., 762 Broad St., Newark, N. J.	Oct. 7, 1896
HIDER, ARTHUR. U. S. Asst. Engr.; Res. Engr. in Local Chg. of Impvts., Lake Providence Reach, Mississippi River, Greenville, Miss.....	Sept. 7, 1881
HILDENBRAND, WILHELM. Cons. and Contr. Engr.; Cons. Engr. for John A. Roebling's Sons Co.; Am. Representative of the "Abt" system of rack railways, 1 Broadway, New York City.....	Feb. 5, 1902
HILGARD, KARL EMIL. Cons. Civ. Engr.; Prof. of Civ. Eng., Federal Swiss Polytechnic Inst., 18 Steinwiesstrasse, Zurich, V., Switzer- land.....	June 4, 1890
HILL, ALBERT BANKS. Cons. Civ. Engr., P. O. Box 973, New { Haven, Conn..... { M.	Jun. Feb. 2, 1876 Mar. 5, 1884
HILL, GEORGE. Archt. and Cons. Engr., 100 Broadway, { New York City..... { M.	Oct. 4, 1893 Feb. 1, 1899
HILL, JOHN WILLMUTH. Chf. Engr., Bureau of Filtration { (Impvt., Extension and Filtration of the Water Supply), { 710 City Hall, Philadelphia, Pa.; Cons. Engr., Glenn { Bldg., Cincinnati, Ohio..... {	Jun. Feb. 3, 1875 M. April 5, 1876
HILL, WALTER HOVEY. Civ. and Min. Engr.; U. S. Deputy Mineral Surv., Grangeville, Idaho.....	June 5, 1901

## MEMBERS H

Date of Membership.

<b>R. HILL, WILLIAM RYAN.</b> Chf. Engr., Aqueduct Comm., 280 Broadway, New York City.....	July 1, 1891
<b>HILTON, GEORGE PORTER.</b> Vice-Pres., Hilton Bridge Constr. Co., Albany, N. Y.....	May 1, 1889
<b>HIMES, ALBERT JAMES.</b> 521 Hickox Bldg., Cleveland, { Assoc. M. Ohio ..... } M.	Nov. 6, 1895 June 7, 1899
<b>HIMMELWRIGHT, ABRAHAM LINCOLN ARTMAN.</b> Mgr., The Roebling Constr. Co., 121 Liberty St., New York City.....	Oct. 5, 1898
<b>HINCKLEY, HOWARD VERNON.</b> U. S. Superv. Engr., Muskogee, Ind. T.	Dec. 5, 1883
<b>HINCKLEY, JOHN FRANKLIN.</b> Chf. Engr. of Constr., Frisco System, 800 Fullerton Bldg., St. Louis, Mo.....	May 6, 1885
<b>HINDS, FRANKLIN ALLEN.</b> Cons. Engr., 28 Flower Bldg., Watertown, N. Y.....	May 3, 1899
<b>HITCHCOCK, FREDERICK COLLAMORE.</b> Care, Geo. S. Good & { Assoc. M. Co., Tucumcari, N. Mex ..... } M.	Mar. 7, 1894 Feb. 6, 1895
<b>HOAG, SIDNEY WILLETT, Jr.</b> Asst. Engr., Dept. of Docks and Ferries, 208 West 121st St., New York City.....	Sept. 2, 1885
<b>HOBSON, JOSEPH.</b> Chf. Engr.'s Office, Grand Trunk Ry., Montreal, Que., Canada.....	Feb. 5, 1890
<b>HODGDON, FRANK WELLINGTON.</b> Chf. Engr., Mass. Board, Harbor and Land Commrs., Room 131, State House, Boston, Mass.....	Dec. 3, 1884
<b>HODGE, HARRY SEYMOUR.</b> Pres., Sam'l F. Hodge & Co. (Inc.), 320 Atwater St., Detroit, Mich.....	Oct. 3, 1894
<b>HODGE, HENRY WILSON.</b> Cons. Engr. (Boller & Hodge), 1 Nas- { Jun. sau St., New York City..... } M.	Jan. 5, 1887 Oct. 2, 1895
<b>HODGES, GILBERT.</b> Cons. Engr., 131 State St., Room 826 828, Boston, Mass.....	June 4, 1890
<b>HOECH, THEODOR GOTTLIEB.</b> Baurath, Kolberg, Germany.....	June 7, 1893
<b>HOFF, OLAF.</b> Engr. of Structures, N. Y. C. & H. R. R. R., 504 Grand Central Station, New York City.....	May 6, 1885
<b>HOFFMAN, NATHANIEL BAKER KLINK.</b> Asst. Engr., Dept. of Sewers, Bronx, 1199 Boston Road, New York City.....	Nov. 6, 1901
<b>HOLBROOK, ELLIOT.</b> Chf. Engr., K. C. S. Ry., Thayer Bldg., Kansas City, Mo.....	Sept. 3, 1902
<b>HOLBROOK, FREDERICK WILLIAM DOANE.</b> The Navy Yard, Puget Sound, Bremerton, Wash.....	Oct. 6, 1886
<b>HOLBROOK, HENRY RANDOLPH.</b> Pres., The Laguna Canal Co., Pueblo, Colo.....	Jan. 2, 1890
<b>HOLGATE, HENRY.</b> Cons. Engr. (Ross & Holgate), 17 St. John St., Montreal, Que., Canada.....	Oct. 2, 1901
<b>HOLMAN, MINARD LAFEVER.</b> Cons. Engr., 3744 Finney Ave., St. Louis, Mo.....	April 2, 1884
<b>HOLT, HERBERT SAMUEL.</b> Pres., Montreal Gas Co., Montreal, Que., Canada.....	Mar. 6, 1889
<b>HOOD, RICHARD HADEN.</b> Care, R. H. Hood Co., 220 Broad- { Assoc. M. way, New York City..... } M.	May 3, 1893 Nov. 2, 1898
<b>HOOD, WILLIAM.</b> Chf. Engr., S. P. Co., 4 Montgomery St., San Fran- cisco, Cal.....	Oct. 7, 1896

# MEMBERS H

Date of Membership.

HOOKE, CHARLES ADDISON. Civ. and Cons. Engr., 216 North Liberty St., Baltimore, Md.....	Jan.	3, 1900
HOOKE, GULIAN SCHMALZ. Res. Engr., General Electric Co., Schenectady, N. Y.....	Apr.	3, 1901
HOOVER, JOSEPH WARREN. Bridge Engr., 514 New York Life Bldg., Kansas City, Mo.....	June	6, 1888
HOPKINS, CHARLES COMSTOCK. (Knight & Hopkins), Rome, N. Y.....	June	4, 1890
HORTON, HORACE E. Prop., Chicago Bridge & Iron Co., Throop and 105th Sts., Chicago, Ill.....	Sept.	6, 1882
HOTCHKISS, CHARLES WILCOX. Cons. Engr., Monadnock Bldg., Chicago, Ill.....	Jan.	5, 1898
HOUGH, DAVID LEAVITT. Pres., The United Eng. & Contr. Co., 13 Park Row, New York City.....	May	5, 1897
HOUGH, ULYSSES B. Engr. for Bunker Hill & Sullivan Min. & Concentrating Co., Kellogg, Idaho.....	Nov.	5, 1902
HOUSE, FRANCIS EDWIN. Pres., Duluth & Iron Range R. R. Co., Duluth, Minn.....	May	1, 1895
HOVEY, OTIS ELLIS. Engr., Designing Dept., Am. Bridge & Assoc. M. Co., Pencoyd, Pa.....	April	4, 1894
	Jan.	3, 1900
HOWARD, FREDERICK BILLINGS. Ellisville, Miss.....	Jun.	Mar. 3, 1875
	M.	Nov. 6, 1878
HOWARD, JOHN LEWIS. Div. Engr., Met. Water and Sewer- Assoc. M. age Board, 1 Ashburton Pl., Boston, Mass.....	Dec.	7, 1898
	M.	April 2, 1902
HOWE, EDWARD WILLARD. Asst. Engr., Eng. Dept., 65 City Hall, Boston, Mass.....	Sept.	7, 1887
HOWE, HORACE JOSEPH. Asst. Engr., Rapid Transit R. R. Commrs., 231 West 125th St., New York City.....	Jun.	May 2, 1888
	M.	Mar. 2, 1898
HOWE, MALVERD ABRAHAM. Prof. of Civ. Eng., Rose Polytech- Assoc. nic Inst., 2108 North 10th St., Terre Haute, Ind.....	May	7, 1890
	M.	Jan. 1, 1896
HOWE, WILLIAM BELL WHITE. Cons. Engr., Spartanburg, S. C.....	Mar.	1, 1893
HOWELL, DAVID JANNEY. 605 Twelfth St., N. W., Washington, D. C.....	Sept.	5, 1900
HOWELL, FRANKLIN DAVINPORT, Jr. P. O. Box 651, Los Angeles, Cal..	June	5, 1901
HOWELLS, JULIUS MERRIAM. Belvedere, Marin Co., Cal.....	June	4, 1902
HOXIE, RICHARD LEVERIDGE. Maj., Corps of Engrs., U. S. A., U. S. Engr. Office, St. Paul, Minn.....	June	2, 1886
HOYT, WILLIAM EDWIN. Asst. Engr., N. Y. C. & H. R. R. R. Co. (Res., 50 Westminster Rd.), Rochester, N. Y.....	Mar.	5, 1884
HUDSON, CLARENCE WALTER. Asst. Engr., Phoenix Bridge & Assoc. M. Co., Phoenixville, Pa.....	Nov.	7, 1894
	M.	Feb. 7, 1900
HUDSON, JOHN ROGERS. 1806 Locust St., St. Louis, Mo.....	May	4, 1887
HUGHES, WILLIAM MACKENZIE. Cons. Bridge Engr., 1511 Great North- ern Bldg., Chicago, Ill.....	June	2, 1880
HULL, FRANK EUGENE. Warren, Me.....	Mar.	6, 1901
HUMPHREYS, ALEXANDER CROMBIE. Pres., Stevens Inst. of Tech.; (Humphreys & Glasgow), 31 Nassau St., New York City.....	Mar.	6, 1895
HUMPHREYS, DAVID CARLISLE. Prof. of Civ. Eng., Washington and Lee Univ., Lexington, Va.....	Nov.	2, 1887



# MEMBERS H-J

Date of Membership.

HUNT, CHARLES WARREN. ( <i>Secretary</i> ). 220 West 57th St. (Res., 171 West 88th St.), New York City.....	Jan. 2, 1884
HUNT, CONWAY BETHUNE. Computing Engr., District of Columbia, District Bldg. (Res., 1815 M St., N. W.), Washington, D. C....	Feb. 4, 1891
HUNT, ROBERT WOOLSTON. Cons. Engr., Care, Robert W. Hunt & Co., 1121 The Rookery, Chicago, Ill.....	June 3, 1885
HUNTER, WILLIAM. Chf. Engr., P. & R. Ry., Room 520, Reading Terminal, Philadelphia, Pa.....	June 5, 1895
HURRY, EDWARD HENRY. 16 Connaught St., Hyde Park, London, W., England.....	June 1, 1898
HUTCHINGS, WILLIAM EVELYN. Asst. Engr., L. & N. R. R. Co., 1578 Barrett Ave., Louisville, Ky.....	June 7, 1899
HUTCHINS, JERE CHAMBERLAIN. 148 McDougall Ave., Detroit, Mich.....	Assoc. M. Mar. 2, 1898 M. April 4, 1900
HUTCHINSON, GEORGE HUNT. Chf. Engr., Northwestern Fuel Co., Pioneer Press Bldg., St. Paul, Minn.....	Assoc. M. Sept. 2, 1891 M. June 7, 1893
HUTTON, NATHANIEL HENRY. Harbor Engr.; Pres., Harbor Board, City Hall, Baltimore, Md.....	June 3, 1896
HYDE, ABRAHAM LINCOLN. Instr. in Civ. Eng., Lehigh Univ., 102 South New St., Bethlehem, Pa.....	Assoc. M. April 5, 1893 M. Oct. 6, 1897
INGALLS, OWEN LOVEJOY. Engr. in Chg. of Water-Works and Sewers, Manila, Philippine Islands.....	Jun. Mar. 5, 1890 M. June 4, 1902
INGERSOLL, COLIN MACRAE, Jr. Chf. Engr., N. Y., N. H. & H. R. R., New Haven, Conn.....	June 5, 1895
IRWIN, JAMES CLARK. Supt. of the Lake Erie, Alliance & Wheeling R. R. Co., Alliance, Ohio.....	Jun. April 4, 1893 Assoc. M. Dec. 7, 1898 M. June 6, 1900
ISAACS, JOHN DOVE. Engr. of Bridges, S. P. Co.; Asst. Engr., M. of W., Pacific System and Lines in Oregon, S. P. Co., 4 Montgomery St., San Francisco, Cal.....	Mar. 7, 1894
IVES, ARTHUR STANLEY. Civ. and Elec. Engr., R. D. Wood & Co., 400 Chestnut St., Philadelphia, Pa.....	Jun. Jan. 7, 1896 Assoc. M. Jan. 3, 1900 M. May 7, 1902
IVES, EDWARD BERNARD. Capt., Signal Corps, U. S. A., Headquarters, Dept. of the Colorado, Denver, Colo.....	April 5, 1893
JACKMAN, HOWARD HILL. Asst. Engr., Chesapeake Western Co., Harrisonburg, Va.....	May 6, 1891
JACKSON, DUGALD CALEB. Prof. of Elec. Eng., Univ. of Wisconsin, Cons. Engr., Madison, Wis.....	Nov. 2, 1898
JACKSON, JONES MUMFORD. Schenectady, N. Y.....	Sept. 1, 1886
JACKSON, THOMAS MOORE. Pres., West Va. Short Line R. R., Clarksburg, W. Va.....	June 3, 1891
JACKSON, WILLIAM. ( <i>Director</i> ). City Engr., 50 City Hall, Boston, Mass.....	Sept. 3, 1884
JACOMB-HOOD, JOHN WYKEHAM. Chf. Engr., Lond. & S. W. Ry., Waterloo Bridge Station, London, S. E., England.....	Feb. 5, 1902



# MEMBERS J

Date of Membership.

JAMESON, CHARLES DAVIS. Gen. Mgr., Jameson & Co., Tientsin, China .....	Mar.	7, 1888
JAMIESON, JOHN QUINTIN. 475 Hassalo St., Portland, Ore.....	Nov.	6, 1889
JANNEY, WILLIAM DEAN. Chf. Engr., Northern Ry., Limon, Costa Rica.	April	1, 1896
JAKES, WILLIAM HENRY. Little Boar's Head, N. H. ....	July	2, 1890
JARDINE, ALEXANDER WILLIAM. Brisbane, Queensland, Australia.....	April	2, 1890
JARVIS, CHARLES MAPLES. First Vice-Pres., Am. Hardware Corporation, New Britain, Conn.....	Jan.	7, 1885
JATCOX, THOMAS WILLIAM. Civ. and Hydr. Engr., Leadville, Colo....	Jan.	4, 1882
JENKINS, WILLIAM DUNBAR. Engr.-in-Chg., Arkansas and White River Bridges, Mo. Pac. Ry. Co., Arkansas City, Ark.....	Sept.	7, 1887
JENNINGS, WILLIAM TYNDALE. Cons. Engr., The Molsons Bank Bldg., 48 Knight St., Toronto, Ont., Canada.....	April	2, 1884
JEWETT, WILLIAM CORNELL. Res. Engr., Commrs. of Water-Works (Res., 541 Ridgeway Ave.), Cincinnati, Ohio.....	June	3, 1885
JOHNSON, ALBERT LINCOLN. Engr. for St. Louis Expanded Metal Fire-proofing Co., 606 Century Bldg., St. Louis, Mo. ....	{ Assoc. M. M.	Sept. 2, 1896
		Dec. 4, 1901
JOHNSON, FRANCIS ROBERT. P. O. Box 54, Maritzburg, Natal, South Africa.....	June	1, 1898
JOHNSON, JAMES MORELAND. Engr. and Pres., Louisville Bridge & Iron Co., Louisville, Ky.....	July	1, 1891
JOHNSON, LEWIS ELISHA. Engr. of Constr., Bridge Dept., The Pennsylvania Steel Co., Steelton, Pa.....	{ Assoc. M. M.	Nov. 4, 1896
		May 1, 1901
JOHNSON, LORENZO MEDICI. Apartado 21, Ciudad Porfirio Diaz, Coahuila, Mexico.....	{ Jun. M.	Mar. 3, 1875
		April 7, 1880
JOHNSON, LUCIEN SAMUEL. Jun. Engr., U. S. Engr. Dept., Jamestown, R. I. ....	Dec.	4, 1901
JOHNSON, PHELPS. Mgr., Dominion Bridge Co., Ltd., Windsor Hotel, Montreal, Que., Canada .....	July	1, 1891
JOHNSON, THOMAS H. Cods. Engr., Penn. Lines W. of Pitts., Pittsburgh, Pa.....	Sept.	5, 1877
JOHNSON, WALLACE CLYDE. Chf. Engr., Niagara Falls Hydr. Power & Mfg. Co., and Shawenegan Water & Power Co.; Cons. Engr., Niagara Falls, N. Y., and 1724 Notre Dame St., Montreal, Que., Canada.....	Oct.	5, 1892
JOHNSTON, ALBERT WILLIAM. Gen. Supt., N. Y., C. & St. L. R. R. Co., 424 Hickox Bldg., Cleveland, Ohio.....	Mar.	6, 1895
JOHNSTON, HORACE GREELEY. Mgr., Am. Well & Prospecting Co., Corsicana, Tex .....	Sept.	7, 1887
JOHNSTON, JOHN HOWARD. Care, Backus & Johnston, Lima, Peru.....	Mar.	1, 1876
JONES, WASHINGTON. Con. Mech. Engr., 1632 North 15th St., Philadelphia, Pa.....	Oct.	7, 1874
JORDAN, EDWARD CLARENCE. 31½ Exchange St., Portland, Me.....	May	7, 1890
JUDSON, CHARLES ALBERT. Secy. and Treas., The Erie County Investment Co., Sandusky, Ohio.....	Jan.	3, 1894
JUDSON, WILLIAM PIERSON. Deputy State Engr. of New York, Albany, N. Y.....	Sept.	7, 1881

# MEMBERS J-K

	Date of Membership.
JUDSON, WILLIAM VOORHEES. Capt., Corps of Engrs., U. S. A., Washington Barracks, Washington, D. C.....	Nov. 4, 1896
JUENGST, HENRY FREDERICK. Care, Birmingham Water-Works Co., Birmingham, Ala.....	April 2, 1884
JUST, GEORGE ALEXANDER. Cons. Engr., 128 West 42d St., New York City.....	Sept. 3, 1884 M. Mar. 4, 1891
KADONO, CHOKURO. Engr. and Mgr., Okura & Co., 53 New Broad St., London, E. C., England.....	Jan. 8, 1902
KAREISCHA, SERGE DE. Prof. of the Imperial Inst. of Engrs. of Ways and Communications, Zagorodny prosp., No. 70, log. 4, St. Petersburg, Russia.....	June 6, 1894
KASTL, ALEXANDER EDWARD. Chf. Engr., The Denver Union Water Co., Denver, Colo.....	Jan. 4, 1888 M. Nov. 5, 1890
KATTÉ, WALTER. Cons. Engr., Irvington-on-Hudson, N. Y.....	Oct. 7, 1868
KAUFMAN, GUSTAVE. Contr. Engr., 561 Franklin Ave., Brooklyn, N. Y.	May 7, 1890
KEATING, EDWARD HENRY. Mgr., Toronto Ry. Co., Toronto, Ont., Canada.....	June 7, 1882
KEEFER, GEORGE ALEXANDER. Res. Engr., Dominion Public Works in B. C., New Westminster, B. C., Canada.....	Jan. 2, 1889
KEEFER, THOMAS COLTRIN. (Past-President). Ottawa, Ont., Canada.....	April 4, 1877
KEENE, WILLIAM FAITOUTE. City Engr., Central Falls, R. I.....	Assoc. M. June 3, 1896 M. May 1, 1901
KEITH, GEORGE THOMAS. (Woltmann, Keith & Co.), 11 Wall St., New York City; Address, Olean, N. Y.....	May 4, 1881
KEITH, HERBERT CARY. Bridge Engr., M. C. & F. D. R. R., Fort Dodge, Iowa.....	Dec. 4, 1889
KELLER, CHARLES. Capt., Corps of Engrs., U. S. A., U. S. Engr. Office, 57 Park St., Grand Rapids, Mich.....	Mar. 7, 1900
KELLEY, HOWARD GEORGE. Chf. Engr., Minn. & St. L. R. R. and Iowa Cent. Ry., 1124 Guaranty Bldg., Minneapolis, Minn.....	May 1, 1889
KELLEY, WILLIAM DATUS. Engr., Bldr. and Contr. (Kelly & Kelley), 45 East 42d St., New York City.....	Nov. 2, 1887
KELLOGG, CHARLES. Pres., Imperial Pneumatic Tool Co., Athens, Pa..	June 2, 1880
KELLOGG, NORMAN BENJAMIN. 420 California St., San Francisco, Cal.....	Jun. Feb. 6, 1878 M. July 3, 1895
KELLY, CASSIUS WILLIAM. City Engr., 17 City Hall, New Haven, Conn.....	Jun. Mar. 1, 1882 M. June 6, 1888
KENDRICK, JOHN WILLIAM. Third Vice-Pres., The A. T. & S. F. Ry. System, 77 Jackson St., Chicago, Ill.....	June 6, 1883
KENDRICK, JULIAN WAY. City Engr., Birmingham, Ala., and Chf. Engr., Jefferson Co. (Ala.) San. Comm.....	Oct. 1, 1902
KENLY, WILLIAM LACY. Lake Montebello, Baltimore, Md.....	Nov. 7, 1894
KENLY, WILLIAM WATKINS. Treas. and Gen. Mgr., The U. S. Mortar Supply Co., 1123 Broadway, New York City.....	Nov. 6, 1889
KENNEDY, JAMES HENRY. Chf. Engr., Vancouver, Victoria & East. Ry. & Nav. Co., Grand Forks, B. C., Canada.....	May 2, 1900
KENNEDY, JEREMIAH JOSEPH. Cons. Engr., 52 Broadway, New York City.	June 4, 1902

## MEMBERS K

	Date of Membership.
KENNEDY, JOHN. Chf. Engr., Harbor Commrs., Montreal, Que., Canada.....	Sept. 1, 1875
KENNEDY, WILLIAM HARLIN. Chf. Engr., The Ore. R. R. & Nav. Co., Portland, Ore.....	Sept. 6, 1871
KERNOT, WILLIAM CHARLES. Prof. of Eng., Univ. of Melbourne, Mel- bourne, Victoria, Australia.....	Mar. 6, 1889
KERR, FRANK MONTGOMERY. Asst. State Engr. of La., 831 Bourbon St., New Orleans, La.....	Oct. 2, 1901
KERR, LUTHER YAGER. U.S. Junior Civ. Engr., Box 204, Memphis, Tenn.	June 4, 1902
KHUEH, RICHARD, JR. Div. Engr., Pittsburg Div., Am. } Jun. Bridge Co., 51st and Butler Sts., Pittsburg, Pa. ... } Assoc. M.	Dec. 3, 1891
	May 1, 1895
	Nov. 2, 1898
KIELLAND, SOREN THEODOR MUNCH BULL. Civ. Engr., Buffalo Creek R. R.; Office, 364 Ellicott Sq., Buffalo, N. Y.....	Feb. 6, 1889
KIERSTED, WYNKOOP. Cons. Engr., 58 Water-Works Bldg., Kansas City, Mo. ....	Oct. 5, 1887
KIMBALL, GEORGE ALBERT. Chf. Engr., Elev. Lines, Bost. Elev. } Jun. Ry. Co., 101 Milk St., Boston, Mass..... } M.	May 12, 1875
	July 1, 1891
KIMBALL, GEORGE HENRY. Chf. Engr., Pere Marquette R. R. Co., 72 Delaware Ave., Detroit, Mich. ....	Dec. 3, 1890
KINDER, CLAUDE WILLIAM. Engr. in Chf. and Supt., Imperial Chinese Rys., Tientsin, China.....	June 4, 1890
KING, CHARLES CYRUS. Chf. Engr., C. W. Hunt Co., West New Brighton, Richmond Co., N. Y.....	Sept. 2, 1891
KING, PAUL SOURIN. Cons. Engr., 25 West 23d St., New York City ..	July 3, 1889
KING, WILLIAM BYRD. Gen. Mgr., Fort Worth Stock Yards and Fort Worth Belt Ry., Fort Worth, Tex. ....	Oct. 7, 1896
KING, WINFIELD SCOTT. Chf. Engr., Union Stock Yards & R. R. Co., South Omaha, Nebr.....	Dec. 6, 1899
KINGMAN, LEWIS. Chf. Engr., Mex. Cent. Ry., City of Mexico, D. F., Mexico .....	July 1, 1885
KINGSLEY, MARVIN WATSON. 1022 Rose Bldg., Cleveland, Ohio.....	July 3, 1878
KINNEY, EDWARD CORNELIUS. Gen. Mgr., West Gallatin Irrig. Co., Bozeman, Mont.....	May 3, 1882
KINSLEY, THOMAS PEARSON. Broadway and 157th St., New York City.	Feb. 5, 1873
KIRKPATRICK, WALTER GILL. Civ. and San. Engr., City } Assoc. M. Hall, Jackson, Miss..... } M.	April 6, 1892
	Oct. 5, 1898
KITTEDGE, GEORGE WATSON. Chf. Engr. of The C., C., & St. L. Ry. Co., Cincinnati, Ohio.....	Jan. 6, 1886
KITTRELL, JAMES WESSON. Smith's Landing, Greene Co., N. Y.....	Sept. 1, 1897
KLAPP, EUGENE. Div. Engr., Rapid Transit R. R. Commrs., 231 West 125th St., New York City.....	Feb. 6, 1901
KLEINBECK, AUGUST GUSTAVE. Engr., Bridges and Bldgs., Oklahoma City & West. R. R., P. O. Box 1062, Oklahoma City, Okla. ....	Feb. 3, 1897
KLUEGEL, CHARLES HENRY. Chf. Engr., Oahu Ry. & Land Co., P. O. Box 796, Honolulu, Hawaiian Islands.....	Oct. 1, 1902
KNAP, JOSEPH MOSS. (Treasurer). 103 West 58th St., New York City.....	April 5, 1882

## MEMBERS K-L

Date of Membership.

KNAPP, LOUIS HENRY. Civ. and Hydr. Engr., 280 Linwood Ave., Buffalo, N. Y.....	Mar.	4, 1874
KNICKERBACKER, JOHN. Pres., Eddy Valve Co. of Waterford, N. Y.; Res., 86 First St., Troy, N. Y.....	Jan.	2, 1900
KNIGHT, WALTER HARRIS. 20 Broad St., New York City.....	Feb.	1, 1893
KNOWLTON, CHARLES ANDREWS. Administrador, Central Ysabel, Guan- tanamo, Cuba.....	Oct.	2, 1901
KONDO, SENTARO. Doboku Kantokusho, Tokyo, Japan.....	Nov.	7, 1900
KONDO, TORAGORO. Chf. Engr., Home Dept., Tokyo, Japan....	{ Jun. M.	Oct. 3, 1888
KUERSTEINER, EMIL EDWARD. Asst. Engr., L. & N. R. R., 1954 Floyd St., Louisville, Ky.....		June 5, 1901
KUICHLING, EMIL. (Director). Cons. Engr., 209 Clinton Ave., North, Rochester, N. Y.....	Dec.	1, 1897
KUNZ, FREDERIC CHARLES. Asst. to Vice-Pres., Eng. Dept., } Assoc. M. Am. Bridge Co., Pencoyd, Pa..... } M.	Sept.	3, 1884
KUTZ, CHARLES WILLAUER. Capt., Corps of Engrs, U. S. A., Wash- ington Barracks, Washington, D. C.....	Feb.	6, 1895
	Dec.	7, 1898
	May	7, 1902
LABELLE, HENRY FRANCIS. Civ. and Hydr. Engr., Cienfuegos, Cuba....	April	6, 1898
LA CHICOTTE, HENRY ARTHUR. Engr. in Chg. Manhattan Bridge (No. 3) and Blackwell's Island Bridge (No. 4), Dept. of Bridges, New York City.....	Oct.	3, 1894
LAMB, RICHARD. Chf. Engr., Brooklyn Dock & Terminal } Assoc. M. Co., 136 Liberty St., New York City..... } M.	May	6, 1891
	June	6, 1900
LONDON, EUGENE ASHBEL. Vice-Pres. and Mgr., Groton Bridge Co., Groton, Tompkins Co., N. Y.....	April	1, 1896
LANDOR, EDWARD JOHN. Contr. Engr., 209 High St., Canton, Ohio....	Mar.	7, 1888
LANDRETH, OLIN HENRY. Prof. of Eng., Union Coll.; Cons. Engr., Schenectady, N. Y.....	Sept.	3, 1884
LANDRETH, WILLIAM BARKER. Res. Engr., Eastern Div., New York State Canals, State Hall, Albany, N. Y.....	Oct.	3, 1888
LANGE, GUNARDO AUFIN. Care of Fr. J. Morison, Casilla de Correa No. 1098, Buenos Aires, Argentine Republic.....	Mar.	3, 1897
LANGTON, JOHN. Mech. and Elec. Engr., 72 Trinity Pl., New York City.	May	2, 1900
LANSING, EDWARD TEN EYCK. City Engr., Little Falls, N. Y.....	Sept.	3, 1902
LATCHA, JACOB ALBERT. Coldwater, Mich.....	May	7, 1873
LAUB, HERMANN. Lewis Blk., Pittsburg, Pa.....	Sept.	1, 1897
LAWLOR, FRANCIS DENIS HUBERT. Citizens Water Co., Burling- { Jun. ton, Iowa..... } M.	Oct.	6, 1886
	Mar.	6, 1895
LAWTON, WILLIAM HENRY. City Engr., Newport, R. I.....	June	2, 1886
LEA, SAMUEL HILL. Cons. Engr., 34 Coal Exchange, Scranton, Pa....	Nov.	3, 1897
LEAVITT, ERASMUS DARWIN. Mech. Engr., 2 Central Sq., Cambridge, Mass.....	July	2, 1873
LEAVITT, FRANK McDOWELL. Mech. Engr., 258 Broadway, New York City.....	Dec.	2, 1885
LE BARON, JOHN FRANCIS. Cons. Engr.; Pres., Brookside Medi- cinal Plantation Co., 1329 Williamson Bldg., Cleveland, Ohio..	June	7, 1882



# MEMBERS L

		Date of Membership.
LE CONTE, LOUIS JULIAN.	U. S. Asst. Engr. in Chg., Oakland Harbor Works (P. O. Box 482), Oakland, Cal.....	April 4, 1877
LEDERLE, GEORGE ANTHONY.	171 La Salle St., Chicago, Ill.....	{ Jun. May 2, 1883 M. Oct. 6, 1883
LEDLIE, CHARLES HEES.	918 Rialto Bldg., St. Louis, Mo.....	Jan. 4, 1888
LEDoux, JOHN WALTER.	Chf. Engr., The Am. Pipe Mfg. Co. and The National Gas & Constr.Co., 112 North Broad St., Philadelphia, Pa.....	June 5, 1895
LEE, EDWARD HERVEY.	Engr. and Gen. Roadmaster, Chic. & W. Indiana R. R., 45 Dearborn Station, Chicago, Ill.....	June 6, 1900
LEE, WELLINGTON BARNES.	Travelling Representative, { Assoc. M. Feb. 5, 1896 Ramapo Iron Works, Hillburn, Rockland Co., N. Y. } M. May 4, 1898	
LEFFINGWELL, WILLIAM HOWLAND.	Civ. and Min. Engr., U. S. Deputy Mineral Surv., Lake City, Colo.....	Oct. 4, 1893
LEHLBACH, GUSTAV.	770 Broad St., Newark, N. J.....	Mar. 7, 1883
LEHNARTZ, FREDERICK WILLIAM.	U. S. Asst. Engr., Grand Rapids, Mich.....	Aug. 6, 1879
LEISEN, THEODORE ALFRED.	Cons. Engr.; Chf. Engr. of Parks, Wilmington, Del.....	June 2, 1897
LELAND, GEORGE HERBERT.	929 Banigan Bldg., Providence, { Jun. Mar. 2, 1887 R. I. } M. Feb. 1, 1893	
LELAND, WARREN ALLSTON.	U. S. Asst. Engr., 1300 Washington St., Columbia, S. C.....	Oct. 3, 1900
LEONARD, HENRY READ.	Engr. of Bridges, P. R. R., Broad St. Station, Philadelphia, Pa.....	April 4, 1894
LEVERICH, GABRIEL.	373 Stuyvesant Ave., Brooklyn, N. Y.....	July 6, 1870
LEWISON, MAXYMILIAN.	128 West 42d St., New York City.....	Feb. 7, 1894
LEWIS, EUGENE CASTNER.	(Director). Gen. Mgr., Sycamore Powder Co.; Pres., L. & N. Terminal Co., Nashville, Tenn.....	Mar. 5, 1873
LEWIS, EVERETT WILSON.	Asst. Engr., N. P. Ry., Blackduck, Minn..	Sept. 4, 1901
LEWIS, FREDERICK HUMPHREVILLE.	Mgr., Virginia Portland Cement Co., Craigsville, Va.....	Jan. 6, 1897
LEWIS, NELSON PETER.	Chf. Engr. to the Board of Estimate and Apportionment, City Hall, New York City.....	Oct. 2, 1895
LEWIS, SIDNEY FRANCIS.	State Engr., 4th Floor, Room 2, Cotton Exchange Bldg., New Orleans, La.....	May 4, 1881
LIBBY, EDMUND DORMAN.	6 Liberty St., Concord, N. H.....	May 6, 1885
LIEB, JOHN WILLIAM, JR.	Assoc. Gen. Mgr., The New York Edison Co., 55 Duane St. (Res., 869 West End Ave.), New York City...	Oct. 5, 1898
R. LINDENTHAL, GUSTAV.	45 Cedar St., New York City.....	May 3, 1882
LINTON, HARVEY.	City Engr., Altoona, Pa.....	Oct. 5, 1892
LINVILLE, JACOB HAYS.	Cons. Engr., 107 South 40th St., Philadelphia, Pa.....	Mar. 3, 1875
LIPPINCOTT, JOSEPH BARLOW.	Hydr. Engr.; Res. Hydrographer, U. S. Geological Survey, 406 Byrne Bldg., Los Angeles, Cal.....	Dec. 6, 1899
LLEWELLYN, FRANCIS JOHN.	Contr. Mgr., Structural and Highway Bridge Dept., Am. Bridge Co. of N. Y., 1315 Monadnock Blk., Chicago, Ill.....	Nov. 4, 1896



## MEMBERS L-M

Date of Membership.

LOCKE, CHARLES ABBOTT. Nashville, Tenn.....	Oct.	3, 1888
LOCKE, FRANKLIN BUCHANAN. North Adams, Mass.....	Mar.	1, 1893
LOCKWOOD, JAMES BUTTON CLYDE. Cons. Engr., 70 Dexter Horton Bldg., Seattle, Wash.....	Mar.	6, 1901
LOCKWOOD, JUDD ALLEN. Asst. Engr., Dept. of Bridges, 600 Lenox Ave., New York City.....	April	4, 1899
LOFLAND, HENRY FIDDEMAN. Mgr., Eastern Div., Erecting Dept., Am. Bridge Co. of N. Y., Pencoysd, Pa.....	June	2, 1897
LONG, THOMAS JOHN. Vice-Pres., Atlantic, Gulf & Pacific Co., ( Jun. Civ. Engrs. and Contrs., Park Row Bldg., New York City. ( M.	Nov.	3, 1875
	Jan.	7, 1880
LOOMIS, HORACE. Chf. Engr., Dept. of Sewers, Borough of Manhat- tan, 13 Park Row, New York City.....	Nov.	5, 1879
LOOMIS, THOMAS HOOKER. Res. Engr., Pitts., Tol. & West. R. R., Steubenville, Ohio.....	Jan.	7, 1903
LOREE, LEONOR FRESNEL. B. & O. Central Bldg., Baltimore, Md.....	Oct.	6, 1886
LOW, EMILE. U. S. Asst. Engr., U. S. Engr. Office, 540 Federal Bldg., Buffalo, N. Y.....	May	2, 1888
LOWE, JESSE. (Christie & Lowe), 171 La Salle St., Chicago, Ill.....	Oct.	2, 1895
LOWETH, CHARLES FREDERICK. Engr. and Supt., Bridges and ( Jun. Bldgs., C. M. & St. P. Ry., 1100 Old Colony Bldg., ( M.	Jan.	3, 1883
Chicago, Ill. ....	Feb.	6, 1884
LOWRIE, HARVEY CHILDS. Denver, Colo.....	Mar.	2, 1892
LUCAS, DANIEL JONES. Asst. Engr., Dept. Public Works, ( Jun. Bureau of Filtration of the Water Supply, 710 City Hall, ( M.	Sept.	6, 1876
Philadelphia, Pa. ....	July	4, 1888
LUCAS, EUGENE WILLETT VAN COURT. Capt., Corps of ( Assoc. M.	April	3, 1895
Engrs., U. S. A., U. S. Engr. Office, 280 Second St., ( M.	Sept.	5, 1900
Memphis, Tenn.....		
LUCIUS, ALBERT. 38 Park Row, New York City.....	Mar.	3, 1886
LUDLOW, JACOB LOTT. Cons., Municipal, San. and Hydr. Engr., 434 Summit St., Winston-Salem, N. C.....	Mar.	3, 1897
LUM, DAVID WALKER. Asst. Gen. Supt., Maintenance, Southern Ry. Co., Washington, D. C.....	May	3, 1893
LUNDIE, JOHN. Cons. Engr., 52 Broadway, New York City.....	July	4, 1888
LUSK, JAMES LOBING. Maj., Corps of Engrs., U. S. A., Office, Chf. of Engrs., U. S. A., Washington, D. C.....	Mar.	4, 1891
LUSTER, WILLIAM HENRY, Jr. City Surv., City Hall, Eliza- ( Assoc. M.	Oct.	3, 1900
beth, N. J.....	( M.	April 2, 1902
LYDON, WILLIAM ANTHONY. Pres., Lydon & Drews Co., ( Jun.	Jan.	4, 1888
Contrs., River and Harbor Impvts., Chamber of ( Assoc. M.	Dec.	5, 1894
Commerce, Chicago, Ill.....		
LYNCH, MICHAEL LEHANE. Chf. Engr., St. Louis S. W. System, Tyler, Tex.	May	4, 1892
LYONS, JAMES KNOX. Asst. Div. Engr., Pittsburg Div., ( Assoc. M.	May	1, 1895
Am. Bridge Co., 51st and Butler Sts. (Address, ( M.	Oct.	5, 1898
Dorset Hotel, East End), Pittsburg, Pa.....		
MACALLISTER, DICKINSON. Pres. and Gen. Mgr., The Met. West Side Elev. R. R. Co., Room 1001, Royal Ins. Bldg., Chicago, Ill.....	April	1, 1896

## MEMBERS M

		Date of Membership.
MACDONALD, CHARLES.	247 Fifth Ave., New York City.....	Sept. 15, 1869
MACFARLANE, JAMES.	Ctrc. Cetto de Pasco Co., Cetto de Pasco, Peru.....	April 4, 1888
MACKALL, BENJAMIN FRANKLIN.	Asst. Engr., S. A. L. R. R., Ports- mouth, Va.....	Mar. 6, 1901
MACKENZIE, ALEXANDER.	Col., Corps of Engrs., U. S. A., Office, Chf. of Engrs., Washington, D. C.....	Feb. 2, 1887
MACKENZIE, WILLIAM BROUARD.	Chf. Engr., Intercolonial Ry., } Jun. Moncton, N. B., Canada..... { M.	June 7, 1888 April 3, 1901
N. MACLAY, WILLIAM WALTER.	Cons. Engr., Glens Falls, N. Y.....	Nov. 6, 1872
MACLENNAN, JOHN DONALD.	Contr. Engr., Garfield Bldg., Cleveland, Ohio.....	Oct. 4, 1899
MACNAUGHTON, JAMES.	Pres. and Treas., MacIntyre Iron Co., Tabawus, Essex Co., N. Y.....	May 5, 1880
MACRITCHIE, CHARLES.	21 Quincy St., Chicago, Ill.....	{ Assoc. Oct. 2, 1872 { M. April 5, 1876
MCCALLA, RICHARD CALVIN.	U. S. Asst. Engr., Tusca- { Jun. loosa, Ala. .... { Assoc. M. Sept. 2, 1891 { M. Dec. 5, 1894	
MCCANN, THOMAS HENRY.	Second National Bank Bldg., Hoboken, N. J. (also Care, North River Bridge Co., 45 Cedar St., New York City).....	April 2, 1890
MCCARTY, RICHARD JUSTIN.	3820 Warwick Boulevard, Kansas City, Mo.....	Dec. 4, 1895
MCCCLINTOCK, J. Y.	Commr. of Public Works, Rochester, N. Y.....	Oct. 2, 1895
MCCCLINTOCK, WILLIAM EDWARD.	Chairman; Mass. Highway Comm., 20 Pemberton Sq., Boston, Mass.....	Dec. 5, 1888
MCCOLLOM, THOMAS CHALMERS.	4606 Springfield Ave., Philadelphia, Pa.....	May 3, 1882
MCCOMB, CHARLES OSCAR.	City Engr. and Engr. of Water Board, Watertown, N. Y.....	May 2, 1900
MCCOMB, DAVID E.	Supt. of Sewers, Washington, D. C.....	Feb. 7, 1877
MCCOOL, DANIEL.	Pres., Newaygo Portland Cement Co., Muskegon River Water Power Co., Vice-Pres., Grand Rapids Edison Co., Newaygo, Mich.....	Sept. 5, 1883
MCCORMICK, GEORGE KING.	Roadmaster, P., P. & A., South } Jun. Ala., B., S. & N. O. Divs., L. & N. R. R., Pensacola, Fla. { M.	Feb. 6, 1889 May 4, 1898
MCCORMICK, ROBERT HUGH.	Cons. Engr., 6 Jones Bldg., Detroit, Mich.....	Sept. 7, 1898
MCCULLOH, WALTER.	City Engr., Niagara Falls, N. Y.....	{ Jun. July 4, 1888 { M. June 7, 1893
MCCURDY, JOHN EGBERT.	Apartado 2217, City of Mexico, Mexico..	April 1, 1896
MCDONALD, HUNTER. (Director).	Chf. Engr., N., C. & St. L. } Jun. Ry., Nashville, Tenn..... { M.	April 4, 1883 Mar. 7, 1888
MCDONALD, JOHN ALEXANDER.	Care, James E. McDonald, 4 Chapel St., Cripplegate, London, E. C., England.....	Feb. 5, 1890
MCDONALD, WILLIAM NAYLOR.	Chf. Engr., Tenn. Cent. Ry., Nash- ville, Tenn.....	Sept. 3, 1902

## MEMBERS M

	Date of Membership.
McGRATH, WALLACE. 1112 Tennessee St., Lawrence, Kans.....	Sept. 5, 1883
McGREW, ANSON BURLINGAME. Asst. Engr., Pitts., Carnegie & West. R. R., Beaver, Pa.....	June 1, 1902
McHENRY, EDWIN HARRISON. Chf. Engr., Canadian Pacific Ry., Montreal, Que., Canada .....	Feb. 5, 1896
McKAY, JOHN EDWARDS. Prin. Asst. Engr., Dept., Water Supply, Gas and Electricity, 13 Park Row, New York City.....	July 5, 1893
McKEEN, BENJAMIN. Supt., Terminals, Penn. Lines, Chicago, Ill..	Nov. 6, 1895
McKENZIE, THEODORE HALL. Engr., State Board of Health; Mem., State Board of Civ. Engrs., 40 Stearns Bldg., Hartford, Conn...	Sept. 7, 1881
McKEOWN, THOMAS. 3135 Main St. (Office, 197 Pearl St.), Buffalo, N. Y.....	Dec. 3, 1879
McKIM, ALEXANDER RICE. Cons. Architectural Engr., 106 } Assoc. M. East 23d St., New York City .....	April 4, 1894
McKIM, JAMES ARTHUR. Vice-Pres. and Gen. Mgr., Noelke-Richards Iron Works (Res., 2150 North Meridian St.), Indianapolis, Ind.	May 4, 1898
McKINSTRY, CHARLES HEDGES. Capt., Corps of Engrs., U. } Assoc. M. S. A., Washington Barracks, Washington, D. C., ... }	Oct. 2, 1901
McLAIN, LOUIS RANDOLPH. Pres., Florida Eng. Co., St. Augustine, Fla.....	Sept. 2, 1896
McLAUGHLIN, JOHN JOSEPH. County Engr., Queens Co., Jamaica, N. Y.....	May 3, 1899
McMATH, ROBERT EMMET. Pres., R. E. McMath Surveying Co., and Cons. Engr., 328 Lincoln Trust Bldg., St. Louis, Mo.....	Feb. 2, 1881
McMILLAN, CHARLES. Prof. of Civ. Eng. and Applied Math., Princeton Univ., Princeton, N. J.....	Nov. 1, 1893
McMINN, THOMAS JAMES. (Assistant Secretary). 220 West 57th St., New York City .....	Mar. 3, 1880
McNICOL, JOHN ALEXANDER. 39 Cortlandt St., New York City.....	Jan. 29, 1868
McNULTY, GEORGE WASHINGTON. 258 Broadway, New York City.....	Mar. 5, 1890
McVEAN, JOHN JAY. 29 Eureka St., Pasadena, Cal.....	Sept. 1, 1897
MAIS, HENRY COATHUPE. Prell's Bldgs., 60 Queen St., Melbourne, Victoria, Australia.....	May 5, 1880
MAITLAND, ALEXANDER, Jr. Contr. Mgr., Am. Bridge Co. of N. Y., Kansas City, Mo.....	Sept. 3, 1884
MALTBY, FRANK BIERCE. Asst. Engr. and Supt., Dredging Operations, Mississippi River Comm., Box 217, Memphis, Tenn.....	June 6, 1883
MAN, ALBON PLATT. Gen. Mgr., The Arminius Chemical Co., Mineral, Va .....	Nov. 6, 1901
MANLEY, HENRY. Asst. Engr., Eng. Dept., Room 52, City Hall, Boston, Mass.....	April 3, 1895
MANNING, WILLIAM THURSTON. Cons. Engr., 502 Equitable Bldg., Baltimore, Md.....	Sept. 5, 1883
MANSFIELD, MARTIN WILLIAM. Supt., Penn. Lines, Indianapolis, Ind.	June 2, 1880
MANSON, MARSDEN. Pres., Board of Public Works, City Hall, San Francisco, Cal.....	Feb. 5, 1896
MARBURG, EDGAR. Prof. of Civ. Eng., Univ. of Pennsylvania, Philadelphia, Pa.....	July 5, 1882
	Sept. 6, 1882
	Oct. 6, 1897

# MEMBERS M

Date of Membership.

MARDEN, HENRY HERMAN, Jr.	515 Bedford Ave., Brooklyn, N. Y.....	May	1, 1901
MARINDIN, HENRY LOUIS.	Asst. U. S. Coast and Geodetic Survey, Washington, D. C.....	May	7, 1884
MARPLE, WILLIAM MCKELVEY.	Engr., The Scranton Gas & Water Co., The Dunmore Gas & Water Co., The Olyphant Water Co., The Archbald Water Co., Scranton, Pa.....	June	4, 1890
MARR, GEORGE ANSON.	Supt. and U. S. Asst. Engr., Portage Lake Ship Canals, Mich., Houghton, Mich.....	Oct.	3, 1883
MARSHALL, HORACE MILLER.	Asst. Engr., U. S. Engr. Office, Vicks- burg, Miss.....	Dec.	3, 1890
MARSTRAND, OTTO JULIUS.	Mgr., Atlas Co., Ltd., Hopetoun House, Lloyds Ave., London, E. C., England.....	May	7, 1890
MARTIN, CHARLES CYRIL.	Cons. Engr. to Dept. of Bridges, New York City, 179 Washington St., Brooklyn, N. Y.....	July	10, 1872
MARTIN, WILLIAM.	U. S. Asst. Engr., 14 Sprague Ave., Bellevue, Pa.	Jan.	7, 1903
MARTIN, WISNER.	Park Row Bldg., New York City.....	{ Jun.	May 3, 1892
		{ Assoc. M.	July 3, 1895
		{ M.	May 1, 1901
MARVIN, FRANK OLIN.	Prof. of Civ. Eng. and Dean of the School of Eng., Univ. of Kansas, Lawrence, Kans.....	May	5, 1897
MARX, CHARLES DAVID.	Prof. of Civ. Eng., Leland Stanford, Jr., Univ.; Cons. Engr., Stanford University, Santa Clara Co., Cal..	Oct.	7, 1896
MASON, ARTHUR JOHN.	5733 Monroe Ave., Chicago, Ill.....	Sept.	5, 1888
MASON, SAMPSON DOUGLAS.	Supt., U. S. Fortification Work, Fort Casey, Island Co., Wash.....	Oct.	6, 1886
MATCHAM, CHARLES ARTHUR.	Mgr., Lehigh Portland Cement Co., Allentown, Lehigh Co., Pa.....	June	5, 1901
MATHER, THOMAS HOGGAN.	Chf. Engr., Syracuse R. R. Constr. Co., 44 Nottingham Bldg., Syracuse, N. Y.....	Oct.	1, 1902
MAURICE, CHARLES STEWART.	Athens, Pa.....	May	15, 1872
MAURY, DABNEY HERNDON.	Cons. Engr., 129 North Jefferson Ave., Peoria, Ill.....	May	3, 1899
MAXIM, HIRAM STEVENS.	18 Queen's Gate Pl., London, S.W., England.	Oct.	7, 1885
MAXSON, FRANK OSCAR.	Civ. Engr., U. S. N., Cavite, Philippine Islands.....	May	1, 1889
MAXWELL, JAMES RIDDLE.	Cons. Engr., Newark, Del.....	April	17, 1872
MAY, DeCOURCY.	Gen. Mgr., New York Shipbuilding Co., Camden, N. J.....	Mar.	6, 1895
MAY, WILLIAM ANDREW.	Gen. Mgr., Hillside Coal & Iron Co., Box 553, Scranton, Pa.....	July	6, 1881
MAYER, JOSEPH.	1 Broadway, New York City.....	Oct.	3, 1894
MAYNE, CHARLES.	Municipal Engr., Kiangse Rd., Shanghai, China..	Jan.	1, 1896
MEAD, DANIEL WEBSTER.	Cons. Engr., First National } Bank Bldg., Chicago, Ill.....	Assoc. M.	July 1, 1891
		M.	Dec. 6, 1893
MEAD, ELWOOD. (Director).	Chf., Irrig. Investigations, U. S. Dept. Agriculture, Washington, D. C.....	June	7, 1893
MEIGS, MONTGOMERY.	U. S. Civ. Engr., Supt. in Chg., U. S. Des Moines Rapids Canal, Keokuk, Iowa.....	Mar.	5, 1879



## MEMBERS M

	Date of Membership.
MELCHER, FRANK OTIS. Supt., Ill. Div., C. R. I. & P. Ry., Grand Central Station, Chicago, Ill.	Mar. 3, 1897
MELLIS, DAVID ERNEST. Cons. Civ. and Min. Engr., 208 California St., San Francisco, Cal.	Oct. 2, 1895
MELVIN, DAVID NEILSON. Supt. and Engr., Am. Linoleum Mfg. Co., Linoleumville, N. Y.	July 3, 1878
MENOCAL, ANICETO G. Civ. Engr., U. S. N., 251 West 81st St., New York City	Feb. 3, 1875
MERCER, CHARLES HATTON. Asst. Engr. of Constr., Bridge and Constr. Dept., The Pennsylvania Steel Co., Steelton, Pa.	Nov. 3, 1897 May 1, 1901
MERRILL, GEORGE NATHAN. Civ. and Cons. Engr. (Geo. N. Merrill & Co.), 292 Main St., Room 7, Springfield, Mass.	May 1, 1889
MERRILL, WILLIAM FESSENDEN. First Vice-Pres., N. Y., N. H. & H. R. R., New Haven, Conn.	April 1, 1874
MERRIMAN, MANSFIELD. Prof. of Civ. Eng., Lehigh Univ., South Bethlehem, Pa.	May 12, 1875 Sept. 3, 1884
MERRYMAN, WILLIAM CURTIS. Res. Engr., 3d Div., Rapid Transit Subway Constr. Co., 1913 Amsterdam Ave. (Res., 562 West 149th St.), New York City	Oct. 4, 1899
MESSEUREAU, CHARLES VERNON. Asst. Engr., Water-Works Extension, 77 East May St., St. Louis, Mo.	Dec. 3, 1884
R. METCALF, WILLIAM. ( <i>Past-President</i> ). 1 Fulton St., Pittsburg, Pa.	July 2, 1873
MEYER, RUDOLF. With Compañía Fundidora de Fierro y Acero, Apartado 55, Monterey, Mexico.	Oct. 5, 1898
MEYER, THOMAS C. 13 East 48th St., New York City	Dec. 7, 1852
MICHELL, THEOPHILUS. Trichinopoly, Madras Presidency, India	Jan. 2, 1901
MILLER, ALEXANDER MACOMB. Lt.-Col., Corps of Engrs., U. S. A., 2728 Pennsylvania Ave., Washington, D. C.	June 6, 1888
MILLER, CHARLES HENRY. Engr. with McClintic Marshall Const. Co. of Rankin, Pa.; Address, 36 N. Oakland Sq., Pittsburg, Pa.	May 2, 1899
MILLER, HARVEY COOPER. Corrugated Steel Bars as reinforcement and bond in Steel Concrete Constr., 68 Beaver St., New York City	June 5, 1901
MILLER, HIRAM ALLEN. Engr., Reservoir Dept., Met. Water-Works, 124 Walnut St., Clinton, Mass.	May 6, 1896
MILLER, JAMES IMBRIE. Box 11, Montreat, N. C.	Oct. 5, 1887
MILLER, SPENCER. Chf. Engr., Cableway Dept., Lidgerwood Mfg. Co., 96 Liberty St., New York City	July 3, 1889 Nov. 7, 1894
MILLIS, JOHN. Maj. of Engrs., U. S. A., U. S. Engr. Office, Seattle, Wash.	Mar. 7, 1900
MILLS, ARTHUR LORENZO. Vice-Pres., The Paddock Hodge Co., 2132 Glenwood Ave., Toledo, Ohio	May 2, 1888
MILLS, CHARLES MALON. Prin. Asst. Engr., Subway and Elev. R. R. Constr., Phil. Rap. Trans. Co., 9th and Dauphin Sts., Philadelphia, Pa.	June 2, 1886 Sept. 3, 1890
MINER, CHARLES AUGUSTINE. U. S. Asst. Engr., Old Federal Bldg., Wilmington, Del.	April 7, 1897 Dec. 4, 1901



## MEMBERS M

	Date of Membership.	
MIXER, CHARLES ADAM. Res. Engr., Rumford Falls Power Co., Rumford Falls, Me.....	Nov.	1, 1893
MODJESKI, RALPH. Cons. Civ. Engr., 1742 Monadnock Bldg., Chicago, Ill.....	Jun.	Dec. 1, 1886
	Assoc. M.	July 1, 1891
	M.	Mar. 3, 1897
MOHUN, EDWARD. Union Club, Victoria, B. C., Canada.....	April	6, 1892
MOLITOR, DAVID ALBERT. Civ. and Cons. Engr., 125 Park Ave., Fond du Lac, Wis.....	Oct.	6, 1897
MOLITOR, FREDERIC ALBERT. Chf. Engr., Choc., Okla. & Gulf R. R., Little Rock, Ark.....	Nov.	4, 1896
MONCRIEFF, ALEXANDER BAIN. Engr. in Chf., South Australia, Adelaide, South Australia.....	July	4, 1894
MONCRIEFF, JOHN MITCHELL. 1 St. Nicholas Bldgs., Newcastle-upon-Tyne, England.....	Nov.	3, 1897
MONCURE, WILLIAM. Pres., Charlotte, Monroe & Columbia R. R., Raleigh, N. C.....	May	2, 1900
MONTFORT, RICHARD. Chf. Engr., L. & N. R. R., Louisville, Ky. ...	June	6, 1888
MONTGOMERY, JOHN ALEXANDER. Cons. Engr., Room 9, Office Bldg., First Ave., Birmingham, Ala. ....	Jan.	1, 1896
MOODY, BURDETT. Asst. to Chf. Engr., Homestake Min. Co. and Associated Corporation, Lead, S. Dak.....	Assoc. M.	Feb. 3, 1897
	M.	June 5, 1901
MOORE, CHARLES EDWARD. Civ. and Cons. Engr., Santa Clara, Cal. ...	Jan.	7, 1880
MOORE, CHARLES HARRY. First Asst. Engr., Erie R. R. Co., Chic. & Erie R. R. Co., N. Y., S. & W. R. R. Co., 26 Cortlandt St., New York City.....	Assoc. M.	April 5, 1893
	M.	Sept. 4, 1901
MOORE, JAMES EDWIN ALEXANDER. Engr. in Chg. of Designing and Estimating Dept., The Wellman-Seaver-Morgan Eng. Co., Cleveland, Ohio.....	June	5, 1901
MOORE, ROBERT. ( <i>Past-President</i> ). Cons. Engr., Laclede Bldg., St. Louis, Mo.....	April	5, 1876
MOORE, WILLIAM HARLEY. Engr. of Bridges, N. Y., N. H. & H. R. R., New Haven, Conn.....	June	4, 1895
MORAN, DANIEL EDWARD. 35 Nassau St., New York City. ....	Assoc. M.	June 3, 1891
	M.	Jan. 1, 1896
MORDECAI, AUGUSTUS. Asst. Chf. Engr., Erie R. R., Cleveland, Ohio.	Feb.	1, 1893
MORISON, GEORGE SHATTUCK. ( <i>Past-President</i> ). 49 Wall St., New York City.....		Jan. 6, 1875
MORLEY, FRED. Lapeer, Mich.....	Assoc. M.	May 6, 1891
	M.	Mar. 4, 1896
MORRILL, GEORGE SULLIVAN. Div. Engr., N. Y., N. H. & H. R. R. Boston, Mass.....	Mar.	2, 1887
MORRIS, CHARLES JOHN AUGUSTUS. Cons. Engr. and Contr., P. O. Box 254, St. Paul, Minn.....	Oct.	3, 1883
MORRIS, HENRY GURNEY. Engr. and Machinist, 408 Phila. Bourse, Philadelphia, Pa.....	Dec.	4, 1867
MORRIS, MARSHALL. Cons. Engr.; Pres., The Breckinridge Asphalt Co., Room 303, Norton Bldg., Louisville, Ky.....	Mar.	5, 1873

## MEMBERS M-N

	Date of Membership.
MORRISON, HENRY PRENTICE. Broadway and Forest Ave., West New Brighton, N. Y.....	April 6, 1898
MORSE, BENJAMIN FRANKLIN. 729 Hiddings Ave., Cleveland, Ohio.....	July 12, 1877
MORSE, CHARLES ADELBERT. Prin. Asst. Engr., A., T. & S. F. Ry., La Junta, Colo.....	April 6, 1898
MORSE, CHARLES JAMES. 1825 Asbury Ave., Evanston, Ill.....	Feb. 6, 1884
MORSE, CHARLES MILLER. Deputy Engr. Commr., Bureau of Eng., Buffalo, N. Y.....	Jan. 2, 1895
MORSE, EDWIN KIRTLAND. Carnegie Bldg., Pittsburg, Pa.....	June 6, 1900
MORSE, HENRY GRANT. Pres., New York Shipbuilding Co., 2019 Walnut St., Philadelphia, Pa.....	April 7, 1880
MORTON, CHARLES. Cons. Civ. Engr., 53 State St., Boston, Mass.....	Oct. 2, 1895
MOSMAN, ALONZO TYLER. Asst., U. S. Coast and Geodetic Survey, Washington, D. C.....	July 1, 1885
MOSSCROP, ALFRED MITTON. Vice-Pres. and Mgr., Balti- more Bridge Co., Bush St. and B. & O. R. R., Balti- more, Md.....	Jun. May 4, 1887 Assoc. M. May 3, 1893 M. Oct. 4, 1899
MOULTON, MACE. Cons. Engr., Springfield, Mass.....	June 4, 1884
MUENSCHER, EMORY WASHBURN. Chf. Engr. Manistee & Grand Rapids R. R., Manistee, Mich.....	July 5, 1893
MÜNSTER, ANDREW WENDELBO. Engr. of Bridges, C. G. W. Ry., Care, Engr.'s Office, C. G. W. Ry., St. Paul, Minn.....	May 1, 1889
MURAKAMI, KYOICHI. 14 Wakamatsu-Cho, Osaka, Japan.....	Sept. 4, 1901
MYERS, CHARLES HAYWARD. Aldrich Court, 45 Broadway, New York City.....	Aug. 5, 1868
MYERS, EDMUND TROWBRIDGE DANA. R., F. & P. R. R., Richmond, Va.	May 2, 1888
MYERS, EDMUND TROWBRIDGE DANA, Jr. Civ. Engr., Wm. R. Trigg Co., Richmond, Va.....	Jun. May 2, 1888 M. June 7, 1899
MYERS-BESWICK, WILLIAM BESWICK. 14 Victoria St., Westminster, S. W., London, England.....	Jan. 3, 1894
NEALE, JOHN COLWELL. Structural Engr., Carnegie Steel Co., Pittsburg, Pa.....	Jan. 7, 1903
NEHER, CLARENCE RUFUS. Gen. Mgr. and Engr., The Continental Eng. & Contr. Co., 305 D. S. Morgan Bldg., Buffalo, N. Y.....	June 4, 1902
NELLES, GEORGE THOMAS. U. S. Asst. Engr., 722 Hickox Bldg., Cleveland, Ohio.....	Oct. 3, 1888
NEWELL, FREDERICK HAYNES. Chf. Engr., U. S. Reclamation Service, 1330 F. St., N. W., Washington, D. C.....	Dec. 5, 1900
NEWMAN, ROBERT MORRIS. Jackson, Mich.....	May 6, 1874
NICHOL, JOHN. 21 Quincy St., Chicago, Ill.....	Assoc. Oct. 2, 1872 M. April 5, 1876
NICHOLS, EDWIN JAY. Asst. Engr., St. L. S. W. Ry. Co., 816 West Third Ave., Pine Bluff, Ark.....	Sept. 2, 1896
NICHOLS, LEWIS ABEL. Pres., Nichols Eng. & Contr. Co., 225 Dearborn St., Chicago, Ill.....	Oct. 5, 1892
NICHOLS, OTHNIEL FOSTER. Engr. in Chg., Williamsburgh Bridge, 42 Gates Ave., Brooklyn, N. Y.....	June 7, 1876

## MEMBERS N-O

	Date of Membership.
NICHOLS, WILLARD ATHERTON. Redlands, Cal.....	May 7, 1873
NICHOLSON, GEORGE BENSON. Chf. Engr., C., N. O. & T. P. Ry. Co., and A. G. S. R. R. Co., 530 Garrard St., Covington, Ky.....	May 1, 1878
NICOLLS, WILLIAM JASPER. 1018 South 49th St., Philadelphia, Pa....	June 5, 1878
NICOLSON, GEORGE LLEWELLYN. Gen. Mgr., C. & O. Canal, Washington, D. C.....	Dec. 5, 1894
NOBLE, ALFRED. ( <i>President</i> ). 20 West 34th St., New York City.....	Jun. Sept. 2, 1874
NOBLE, THERON AUGUSTUS. Hydr. Engr., Room 29, Downs Blk., Seattle, Wash.....	April 3, 1878
NORRIS, ROBERT VAN ARSDALE. Chf. Engr., P. R. R. Coal Cos., { Wilkesbarre, Pa.....	June 2, 1897
N. NORTH, EDWARD P. 220 West 57th St., New York City.....	Dec. 7, 1887
NORTHUP, HERBERT FRANKLIN. Res. Engr., C., C. & St. L. Ry., Guilford, Ind.....	Mar. 5, 1902
NORTON, ALBERT GRAY. Div. Engr., B. & O. R. R., Wheeling, W. Va. ....	Dec. 4, 1867
NORTON, JOHN TALCOTT. Thomastown, La.....	Jan. 6, 1892
NOSTRAND, PETER ELBERT. Official Surv., The Lawyers' { Title Insurance Co. of New York; Cons. Engr., 37 { Liberty St., New York City.....	Nov. 3, 1897
NOYES, ELLIS BRADFORD. Civ. Engr.'s Office, U. S. Navy Yard, { Norfolk, Va.....	Assoc. M. Sept. 7, 1892
	M. Mar. 6, 1895
OAKLEY, FRANK THOMPSON. Civ. and Cons. Engr. (Oakley { & Tonson), 1014 The Spitzer, Toledo, Ohio.....	Jun. July 7, 1880
OAKERSON, JOHN AUGUSTUS. Mem., Mississippi River Comm., 1119 Fullerton Bldg., St. Louis, Mo.....	Mar. 5, 1884
ODELL, FREDERICK SYLVESTER. Port Chester, N. Y.....	July 5, 1893
O'DONNELL, JOHN PATRICK. Palace Chambers, Westminster, London, S. W., England.....	Sept. 5, 1883
O'HANLY, JOHN LAWRENCE POWER. Cons. Engr., Ottawa, Ont., Canada.	July 5, 1893
OLCOTT, EBEN ERSKINE. Min. Engr., 36 Wall St., New York City.....	Feb. 7, 1900
OLMSTED, FRANK HENRY. Cons. Engr. (Quinton, Olmsted & Sanders), 219 Laughlin Bldg., Los Angeles, Cal.....	Jun. April 30, 1895
OLNEY, ALFRED CLARENCE. 27 Pitt St., Charleston, S. C.....	M. Nov. 2, 1898
OLNEY, LA FAYETTE. Civ. Cons. Engr., 99 Nassau St., New York City.	Oct. 7, 1868
OPDYKE, STACY BROWN, Jr. Vice-Pres., Levering & Garrigues Co., Dudellen, N. J.....	Feb. 2, 1876
ORANGE, JAMES. (Leigh & Orange), Hong Kong, China.....	Dec. 3, 1890
O'ROURKE, JOHN FRANCIS. Pres., O'Rourke Eng. Constr. Co., Park Row Bldg., New York City.....	April 2, 1884
OSBORN, FRANK CHITTENDEN. ( <i>Director</i> ). Pres., The Osborn Eng. Co., Osborn Bldg., Cleveland, Ohio.....	Oct. 3, 1888
OSGOOD, JOSEPH OTIS. ( <i>Director</i> ). Chf. Engr., C. R. R. { of N. J., Jersey City, N. J. (Res., Plainfield, N. J.)....	Jun. May 3, 1876
O'SHAUGHNESSY, MICHAEL MAURICE. Care, Alexander & Baldwin, Honolulu, Hawaiian Islands.....	M. Mar. 5, 1879
	June 4, 1902

# MEMBERS O P

Date of Membership.

OSTROM, JOHN NELSON. Bridge Engr., 1525 Frick Bldg., Pittsburg, Pa.	Nov. 5, 1890
OSTRUP, JOHN CHRISTIAN. Pres. and Chf. Engr., Beacon } Assoc. M.	Mar. 4, 1896
Eng. Co., 7 Water St., Boston, Mass. .... } M.	Mar. 1, 1899
OTAGAWA, MASAYUKI. Ashio Copper Mines, Shimotsuke, Japan. ....	Jan. 2, 1895
OTIS, GEORGE ELLISON. Div. Engr., Ft. Smith & West. Ry., Mansfield, Ark. ....	July 3, 1895
OWEN, JAMES. Cons. Engr., 196 Market St., Newark, N. J. ....	Sept. 15, 1869
OWENS, HENRY KINDER. Seattle, Wash. ....	Mar. 6, 1889
OXHOLM, THEODOR SMIDT. Prin. Asst. Engr., Office of the Pres. of the Borough of Richmond, West New Brighton, N. Y. ....	Nov. 3, 1897
PACKARD, RALPH GOODING. (R. G. & J. S. Packard), 130 Pearl St., New York City. ....	Feb. 17, 1869
PAGET, EDMUND WINTER. Room 38, Washington Bldg., Portland, Ore. ....	June 5, 1901
PAINE, ARTHUR BICKLEY. 317 Main St., Springfield, Mass. ....	Sept. 6, 1882
PAINE, CHARLES. (Past-President). Cons. Civ. Engr., Tenafly, N. J. ....	Dec. 4, 1867
PALMER, CORNELIUS. Engr., Peninsula Div., C. & N. W. Ry., Escanaba, Mich. ....	Nov. 2, 1887
PALMER, FREDERICK. Bengal Club, 1 Park St., Calcutta, India. ....	Oct. 4, 1899
PARDEE, JAMES THOMAS. Asst. Chf. Engr., Dept. of Public } Assoc. M.	June 5, 1895
Works (Res., 196 Dodge St.), Cleveland, Ohio. .... } M.	June 5, 1901
PARET, MILNOR PECK. Chf. Engr., K. C., M. & O. Ry. Co., 705 Bryant Bldg., Kansas City, Mo. ....	Sept. 2, 1885
PARKER, ANDREW McCLEAN. Engr. and Contr. (Ryan & Parker), 13 Park Row, New York City. ....	Mar. 6, 1889
PARKER, CHARLES JEREMIAH. Chf. Engr., Rutland R. R., Rutland, Vt.	Feb. 7, 1900
PARKER, HAROLD. Mem., Mass. Highway Comm., Clinton, Mass. ....	June 7, 1899
PARKER, MAURICE STILES. Engr. and Contr., Arlington, Tex. ....	Feb. 5, 1890
PARKER, WILLIAM. Div. Engr., Boston & Albany R. R., N. Y. C. & H. R. R. R. Co., Lessee, Room 372, South Station, Boston, Mass.	Mar. 7, 1900
PARKHURST, HENRY WILLIAMS. Engr., Bridges and Bldgs., Ill. Cent. and Y. & M. V. Lines, 1 Park Row, Chicago, Ill. ....	Sept. 5, 1877
PARMLEY, WALTER CAMP. Engr. in Chg. of Sewers, Dept., } Assoc. M.	April 1, 1896
Public Works (Res., 19 Burt St.), Cleveland, Ohio. .... } M.	June 1, 1898
PARSONS, HARRY DE BERKELEY. Cons. Engr., 22 William St., New York City, and Prof. of Steam Eng., Rensselaer Polytechnic Inst., Troy, N. Y. ....	Feb. 3, 1897
PARSONS, HENRY CUYLER. (Parsons & Melius), Tweddle Bldg., Albany, N. Y. ....	Oct. 6, 1886
PARSONS, WILLIAM BARTLEY. Chf. Engr., Rapid Transit Comm., 320 Broadway; Cons. Engr., 22 William St., New York City. ....	June 7, 1882
City. .... } M.	Nov. 2, 1887
PASCHKE, THEODORE. 335 Central Park West, New York City. ....	Mar. 7, 1894
PATTEN, HENRY BENJAMIN. 208 West 2d St., Cheyenne, Wyo. ....	Jan. 4, 1888
PATTERSON, JOHN AUSTIN. Cons. Engr., 420 Walnut St., Philadelphia, Pa. ....	May 2, 1900

# MEMBERS P

		Date of Membership.	
PATTERSON, JOHN CURTIS. Pres., The Philadelphia Clay Mfg. Co., 706 Drexel Bldg., Philadelphia, Pa.....	Oct.	2,	1889
PEARL, JAMES WARREN. Engr. and Contr., Benton Harbor, Mich....	Jan.	2,	1889
PEARSON, FRED STARK. Cons. Engr., 29 Broadway, New York City...	Nov.	3,	1897
PEARSONS, GALEN W. 1611 Baltimore Ave., Kansas City, Mo.....	Jan.	6,	1875
PEARY, ROBERT EDWIN. Civ. Engr., U. S. N., 2014 Twelfth St., N. W., Washington, D. C.....	Mar.	3,	1886
PEGRAM, GEORGE HERNDON. (Director). Chf. Engr., Man- hattan Ry. Co., 195 Broadway, New York City.....	Jun. April	7,	1880
PENCE, WILLIAM DAVID. Prof. of Civ. Eng., Purdue Univ., Lafayette, Ind.....	M. Jan.	3,	1883
PERRINS, CHARLES PENROSE. 2005 DeLancey St., Philadelphia, Pa.....	Oct.	4,	1899
PERKINS, EDMUND TAYLOR. Engr., Reclamation Service, U. S. Geological Survey, Needles, Cal.....	Jun. Feb.	3,	1875
PERRILLIAT, ARSÈNE. Mem., Board of State Engers., Cotton Exchange Bldg., New Orleans, La. ....	M. April	5,	1882
PETERSON, PETER ALEXANDER. Cons. Engr., Canadian Pacific Ry., Montreal, Que., Canada.....	Dec.	3,	1902
PETTIGREW, THOMAS. 1208 Stevenson Bldg., Indianapolis, Ind.....	June	7,	1893
PEW, ARTHUR. Bolton, Ga.....	M. April	5,	1899
PHILLIPS, ASA EMORY. D. C. Asst. Engr.; Engr. in Chg. preparation of plans and constr. of sewage disposal system, 2d and N Sts., S. E., Washington, D. C....	Jun. Nov.	5,	1891
PHILLIPS, HIRAM. Cons. Engr.; Pres., Board of Public Impvts., St. Louis, Mo.....	Assoc. M. Dec.	7,	1898
PHILLIPS, JOSEPH LESLIE. Director of Compañia de Inguarán, Otega 28, City of Mexico, Mexico.....	M. Sept.	4,	1901
PICKETT, WILLIAM DOUGLAS. Four Bear, Big Horn Co., Wyo.....	Assoc. M. Jan.	3,	1894
PIERCE, HENRY. Supt., C. & O. Ry., Ronceverte, W. Va.....	M. Nov.	3,	1897
PIERCE, WILLIAM THOMAS. Chf. Engr., Met. Park Comm., 14 Beacon St., Boston, Mass.....	Nov.	3,	1897
PIERSON, GEORGE SPENCER. Civ., Hydr. and San. Engr., Kalamazoo, Mich.....	Nov.	3,	1897
PIHL, OLAF RIDLEY. 814 Lewis Blk., Pittsburg, Pa.....	July	6,	1853
PLIMPTON, ARTHUR LESLIE. Civ. Engr. in Chg. of Dept. of Civ. Eng., Bureau of Surface Lines, Bost. Elev. Ry. Co., 101 Milk St., Boston, Mass.....	Dec.	5,	1894
PLYMPTON, GEORGE WASHINGTON. Prof. of Civ. Eng., Pol. Inst. (Res., 127 Herkimer St.), Brooklyn, N. Y.....	May	6,	1896
POETSCH, CHARLES JULIUS. City Engr., and Pres., Board of Public Works, Milwaukee, Wis.....	June	5,	1889
POLHEMUS, JAMES SUYDAM. U. S. Asst. Engr., Portland, Ore.....	Oct.	2,	1889
PORTER, ALBERT HEZEKIAH. 77 Bolton Ave., Cleveland, Ohio.....	Oct.	3,	1894
PORTER, DWIGHT. Prof. of Hydr. Eng., Mass. Inst. Tech. Boston, Mass.....	Mar.	6,	1889
POST, GEORGE BROWNE. 33 East 17th St., New York City.....	Oct.	4,	1893
POST, WALTER A. Gen. Supt., Newport News Ship-Building & Dry Dock Co., Newport News, Va.....	Sept.	2,	1896
	Mar.	1,	1893



## MEMBERS P-Q

	Date of Membership.
POTTER, HENRY WITBECK. Care, Westinghouse Co., 120 Broadway, New York City.....	Dec. 5, 1888
POWELL, AMBROSE VINCENT. Cons. Civ. Engr., Chamber of Commerce Bldg., Chicago, Ill.....	Feb. 6, 1901
POWELL, ARCHIBALD OLIN. Prin. Asst. Engr., U. S. Engr. Office, 3d Floor, Bank of Minnesota Bldg., St. Paul, Minn.....	Mar. 2, 1898
POWELL, CHARLES FRANCIS. Maj., Corps of Engrs., U. S. A., P. O. Bldg., New London, Conn.....	Oct. 3, 1888
POWER, GEORGE COFFIN. Ventura, Ventura Co., Cal.....	Feb. 1, 1893
POWERS, JOSEPH ALLEN. 415 Second Ave., Troy, N. Y.....	Jun. April 2, 1884 M. Sept. 3, 1890
POYNOR, DAVID ASHLEY. Athens, Tex.....	June 1, 1892
PRATT, MASON DELANO. Engr. in Chg. of erection of new shops for Frog and Switch Dept., The Pennsylvania Steel Co., Steelton, Pa.....	Jun. Sept. 5, 1888 Assoc. M. Feb. 3, 1897 M. April 3, 1901
PRATT, WILLIAM ABBOTT. Div. Engr., B. & O. R. R. and S. I. R. T. Ry., St. George, N. Y.....	July 5, 1882
PRATT, WILLIAM ARTHUR. Asst. to Chf. Engr., P. R. R. Co., Broad St. Station, Philadelphia, Pa.....	Dec. 4, 1895
PREVOST, SUTHERLAND MALLETT. Third Vice-Pres., P. R. R., Philadel- phia, Pa.....	Jan. 6, 1875
PRICE, WILLIAM GUNN. Engr., Peckham Mfg. Co., Kingston, N. Y....	April 3, 1895
PRICHARD, HENRY SEWALL. Statistician, Am. Bridge Co., Pencoyd, Pa.....	Jan. 2, 1895
PRINCE, EDWARD. Cons. Engr., Quincy, Ill.....	Jun. Feb. 6, 1878 M. Nov. 1, 1882
PRINCE, GEORGE THOMAS. First Asst. Engr., Bureau of Filtration, 105 North 52d St., Philadelphia, Pa.....	April 4, 1894
PRINDLE, FRANKLIN COGSWELL. Civ. Engr., U. S. N., Rear-Admiral (Retired), The Cairo, Washington, D. C.....	Mar. 4, 1874
PRIOR, CHARLES HENRY. 209 Fifth St., South, Minneapolis, Minn....	Mar. 1, 1882
PROBASCO, SAMUEL R. 179 Washington St., Brooklyn, N. Y.....	Nov. 18, 1868
PROUT, HENRY GOSLEE. First Vice-Pres. and Gen. Mgr., Union Switch & Signal Co., Swissvale, Pa. (also 143 Liberty St., New York City).....	Assoc. Nov. 6, 1872 M. Sept. 3, 1879
PURDON, CHARLES DE LA CHEROIS. Chf. Engr., St. L. & San Fran. R. R., 614 Commercial Bldg., St. Louis, Mo.....	Mar. 3, 1886
PURDY, CORYDON TYLER. Cons. Engr., George A. Fuller Co., 137 Broadway, New York City.....	Jan. Feb. 2, 1887 M. Dec. 6, 1893
R. QUIMBY, HENRY HODGE. Asst. Engr. in Chg. of Bridge Div., Bureau of Surveys, 412 City Hall, Philadelphia, Pa.....	Sept. 3, 1890
QUINETTE DE ROCHEMONT, <i>Baron EMILE THEODORE</i> . Inspecteur Gé- néral des Ponts et Chaussées; Directeur des Phares et Balises, 18 Rue de Marignan, Paris, France.....	Jan. 3, 1894
QUINTON, JOHN HENRY. Cons. Engr., 1016 West 8th St., Los Angeles, Cal.....	Feb. 7, 1900
QUINTUS, JOHN CHARLES. Prin. Asst. U. S. Engr., U. S. Engr. Office, 540 Federal Bldg., Buffalo, N. Y.....	Jan. 2, 1889

## MEMBERS R

		Date of Membership.		
RAASLOFF, HARALD DE.	18 Burling Slip, New York City.....	{ Jun.	Dec.	3, 1884
		{ M.	July	3, 1895
RADENHURST, WILLIAM NAMER.	Asst. Engr., Water-Works, Rochester, N. Y.....	{ Jun.	July	7, 1875
		{ M.	July	7, 1880
RAFTER, GEORGE W.	195 Kenwood Ave., Rochester, N. Y.....		April	2, 1884
RAMSEY, JOSEPH, JR.	Pres., Wabash R. R. Co.; Pres., Wheeling & Lake Erie R. R. Co., St. Louis, Mo.....		May	1, 1889
RANDOLPH, BEVERLY STROTHER.	Min. Supt., Consolidation Coal Co., Frostburg, Md.....		May	2, 1888
RANDOLPH, LINGAN STROTHER.	Prof., Mech. Eng., Va. Poly. Inst., Blacksburg, Va.....		Jan.	2, 1890
RAYMOND, CHARLES WALKER.	Lt.-Col., Corps of Engrs., U. S. A., Witherspoon Bldg., Philadelphia, Pa.....		June	1, 1892
RAYMOND, CHARLES WARD.	Care, Crystal Lake G. M. Co., Cisco, Placer Co., Cal.....	{ Jun.	Nov.	7, 1877
		{ M.	April	7, 1886
RAYMOND, WILLIAM GALT.	Prof. of Geodesy, Road Eng. and Topographical Drawing, Rens. Pol. Inst.; Cons. Engr., Troy, N. Y..		Oct.	3, 1894
REA, SAMUEL.	Fourth Vice-Pres., The P. R. R. Co., 225 Broad St. Station, Philadelphia, Pa.....		June	4, 1884
READ, ROBERT LELAND.	32 East 3d St., Cincinnati, Ohio.....		Sept.	2, 1874
REED, DAVID ABELL.	Asst. Chf. Engr., Highland Canal & Power Co., 312 Providence Bldg., Duluth, Minn.....		Mar.	4, 1896
REED, MELVILLE EMERSON.	Asst. Engr., Great Northern Ry. in Chg. of Seattle Tunnel and Terminals, 380 Arcade Bldg., Seattle, Wash.....		Mar.	6, 1901
REED, WILLIAM BOARDMAN.	Engr., M. of W. and Bldgs., Interurban St. Ry. Co., 621 Broadway, New York City.	{ Assoc. M.	Feb.	6, 1895
		{ M.	May	1, 1901
REEVES, DAVID.	Pres., The Phoenix Iron Co.; Pres., Phoenix Bridge Co., 410 Walnut St., Philadelphia, Pa.....	{ Jun.	April	1, 1874
		{ M.	May	3, 1882
RENSHAW, ALFRED HOWARD.	Pres., Standard Signal Co., Troy, N. Y..		June	1, 1898
REYNDEERS, JOHN VAN WICHEREN.	Supt., Bridge and Const. Dept., Pennsylvania Steel Co. (Res., 115 Pine St.), Harrisburg, Pa.....	{ Assoc. M.	June	1, 1892
		{ M.	Mar.	3, 1897
RICE, GEORGE STAPLES.	Deputy Chf. Engr., Rapid Transit R. R. Commrs., 320 Broadway, New York City.....		Feb.	1, 1882
RICE, LEWIS FREDERICK.	Arch. and Civ. Engr.; Asst. Engr., Am. Telephone & Telegraph Co., 125 Milk St., Boston, Mass.....		Jan.	2, 1889
RICE, WALTER PERCIVAL.	(The Walter P. Rice Eng. Co.), 732 Society for Savings, Cleveland, Ohio.....		Mar.	6, 1889
RICHARDS, ALBERT LENNOX.	U. S. Asst. Engr., Rock Island, Ill.....		Jan.	2, 1901
RICHARDS, HUGH TUDOR.	Chf. Engr., San Diego East. Ry., 1941 Lovelace Ave., Los Angeles, Cal.....		Oct.	6, 1886
RICHARDS, JOSEPH THOMAS.	Broad St. Station, Philadelphia, Pa.....		April	4, 1894
RICHARDSON, B. FRANK.	With Rapid Transit Subway Constr. Co., Park Row Bldg. (Res., 540 West 153d St.), New York City.....		July	1, 1885
RICHARDSON, HENRY BROWN.	Chf. State Engr., New Orleans, La.....		May	7, 1879
RICHARDSON, THOMAS FRANKLIN.	Engr., Dam and Aqueduct Dept., Met. Water-Works, Clinton, Mass.....		Nov.	4, 1885

## MEMBERS R

		Date of Membership.	
RICKER, GEORGE ALFRED. 702 Ellicott Sq., Buffalo, N. Y.	{ Jun.	April 7, 1886	
	{ Assoc. M.	May 1, 1895	
	{ M.	April 3, 1901	
RICKETTS, PALMER CHAMBERLAINE. Pres. of, and Prof. of	{ Assoc.	Feb. 3, 1886	
Mechanics, Reisscheider Polytechnic Inst., Troy, N. Y.	{ M.	Oct. 5, 1887	
RICKON, FREDERIC JOHN HENRY. Quartermaster's Dept., U. S. A., 236 Phelan Bldg., San Francisco, Cal.		Jan. 4, 1888	
RIFFLE, ALBERT STANLEY. Care, San Domingo Gold Min. Co., Angels Camp, Calaveras Co., Cal.		May 7, 1890	
RIFFLE, FRANKLIN. Mgr., Iron and Pipe Depts., Dunham, Carrigan & Hayden Co., 17 Beale St., San Francisco, Cal.		Nov. 7, 1888	
RIGGS, HENRY EARLE. Civ. and Cons. Engr. (Riggs & Sherman), 613 The Nasby, Toledo, Ohio.	{ Assoc. M.	Oct. 4, 1893	
	{ M.	April 1, 1896	
RIGGS, MORRIS JOHN. Mgr., Toledo Plant, Am. Bridge Co., Toledo, Ohio.		Dec. 6, 1899	
RIPLEY, HENRY CLAY. Cons. Civ. Engr., River and Harbor Impvt. and Marine Constr., 832 East University Ave., Ann Arbor, Mich.		Oct. 7, 1896	
RIPLEY, JOSEPH. U. S. Asst. Engr., Sault Ste. Marie, Mich.		Sept. 4, 1901	
RISEH, KNUD SOPHUS. Pres. and Engr. in Chg., Grand Rapids Bridge Co., Grand Rapids, Mich.		Feb. 3, 1892	
RITCHIE, JAMES. (Ritchie & Ruple, Civ. and Cons. Engrs.), Chamber of Commerce Bldg., Cleveland, Ohio		Nov. 5, 1890	
RIVES, ALFRED L. Cobham, Albemarle Co., Va.		Sept. 4, 1872	
RIX, EDWARD AUSTIN. Pres., Rix Compressed Air & Drill Co., 396 Mission St., San Francisco, Cal.		April 7, 1897	
ROBERTS, EVELYN PIERREPONT. Civ. and Cons. Engr., 22 William St., New York City		May 7, 1884	
ROBERTS, NATHANIEL. Cons. Engr., 160 Fifth Ave., New York City (Res., 411 Fairmount Ave., Jersey City, N. J.)	{ Assoc. M.	Nov. 4, 1891	
	{ M.	May 2, 1894	
ROBERTS, PERCIVAL, JR. 717 Arcade Bldg., Philadelphia, Pa.	{ Assoc.	May 7, 1879	
	{ M.	June 4, 1884	
ROBINSON, ALBERT ALONZO. Pres., Mex. Cent. Ry. Co., 422 Olive St., St. Louis, Mo.		May 5, 1880	
ROBINSON, ALBERT FOWLER. Bridge Engr., A., T. & S. F. Ry. System 910 Monroe St., Topeka, Kans.		Nov. 2, 1887	
ROBINSON, ARTHUR WELLS. Cons. Engr., Dept. of Public Works of Canada, 879 Dorchester St., Montreal, Que., Canada.		Feb. 3, 1892	
ROBINSON, GEORGE HENRY. 328 Atlas Bldg., Salt Lake City, Utah.		Mar. 7, 1888	
R. ROBINSON, STILLMAN WILLIAMS. Prof. Emeritus in Mech. Eng., Ohio State Univ., Columbus, Ohio.		Jan. 2, 1884	
ROCKWELL, SAMUEL. Prin. Asst. Engr., L. S. & M. S. Ry. Co., Cleveland, Ohio.		Jan. 7, 1880	
RODD, THOMAS. Chf. Engr., Penn. Lines W. of Pitts., Pittsburg, Pa.		June 5, 1878	
ROGERS, MERRITT HARRISON. Tremont Hotel, Denver, Colo.		Jan. 2, 1890	
ROGERS, WALTER ALEXANDER. Vice-Pres., Bates & Rogers	{ Jun.	Sept. 10, 1891	
Constr. Co., 1206 Manhattan Bldg., Chicago, Ill.	{ Assoc. M.	Nov. 3, 1897	
	{ M.	April 4, 1900	

## MEMBERS R-S

		Date of Membership.
ROGGE, JOHN CHARLES LEWIS. Pres. and Mgr., Contrs. Supply Co., 198th St. and Webster Ave., New York City.....	{ Jun.	Mar. 31, 1891
	{ M.	Oct. 5, 1898
ROLLINS, JAMES WINGATE, JR. Contr. (Holbrook, Cabot & Rollins), 1140 Tremont Bldg., Boston, Mass.....		Nov. 7, 1900
ROOD, HENRY MARTIN. 59 Washington St., Port Chester, N. Y. ....		Dec. 3, 1890
ROSE, CHARLES CLEMONS. Supt., Coal Dept., Care, The D. & H. Co., Scranton, Pa. ....		April 4, 1888
ROSENCRANS, EDWIN JOHN. 2441 Seventh Ave., New York City.....		May 7, 1902
ROSENCRANS, WILLIAM HENRY. Chf. Engr. Constr., Ind., Ill. & Iowa R. R., 714 Reaper Blk., 105 Washington St., Chicago, Ill. ....		Oct. 5, 1898
ROSENZWEIG, ALFRED. Cons. Engr., P. O. Box 653, City of Mexico, Mexico.....	{ Jun.	June 7, 1882
	{ M.	Jan. 4, 1893
ROSEWATER, ANDREW. Cons. Engr., Municipal Works, 424 Bee Bldg., Omaha, Nebr.....		Oct. 3, 1883
ROSS, ALEXANDER BELL. Tampico, Mexico.....		May 2, 1900
ROSS, DOUGLAS WILLIAM. State Engr. of Idaho, Boise, Idaho.....		Mar. 1, 1899
ROSS, JAMES. Street Railway Chambers, Montreal, Que., Canada....		Sept. 6, 1882
ROTCH, WILLIAM. Pres., Union Steel & Chain Co., 131 State St., Boston, Mass.....		Mar. 5, 1873
ROULLIER, GUSTAVE ANTHIME. 326 Amity St., Flushing, N. Y. ....		Mar. 1, 1893
R. ROWE, SAMUEL McMATH. Cons. Engr., 226 La Salle St., Chicago, Ill..		Sept. 2, 1885
ROWLAND, CHARLES BRADLEY. The Continental Iron Works, Brooklyn, N. Y. ....		May 1, 1895
ROWLAND, CHARLES LEONARD. Proprietor, Morton Iron Works, 102 Greene St., Brooklyn, N. Y. ....		Sept. 1, 1886
ROWLAND, THOMAS FITCH. Pres., The Continental Iron Works, Brooklyn, N. Y. (Res., 329 Madison Ave., New York City).....	{ M.	Dec. 4, 1867
	{ Hon. M.	Dec. 20, 1899
ROWLAND, THOMAS FITCH, JR. Secy. and Treas., The Continental Iron Works, Brooklyn, N. Y. ....		Sept. 1, 1886
RUDDLE, JOHN. Gen. Superv. of Canals, The Lehigh Coal & Nav. Co., Mauch Chunk, Pa. ....		Oct. 3, 1894
RUGGLES, WILLIAM BURROUGHS. Chf. Engr., Sandy Val. & Elkhorn Ry. Co., Pikeville, Ky. ....		April 7, 1886
RUNDLETT, LEONARD W. Cons. Engr., 309 Ryan Bldg., St. Paul, Minn.		Sept. 5, 1883
RUPLE, COMMODORE PERRY. (Ritchie & Ruple, Civ. and Cons. Engrs.), Chamber of Commerce Bldg., Cleveland, Ohio.....		Mar. 5, 1902
RUSSELL, SILAS BENT. Cons. Civ. Engr., 417 Pine St., St. Louis, Mo. ....	{ Jun.	June 4, 1884
	{ M.	June 1, 1887
RUST, CHARLES HENRY. City Engr., City Hall, Toronto, Ont., Canada .....		April 5, 1899
RUTTAN, HENRY NORLANDE. City Engr., Winnipeg, Man., Canada....		Jan. 4, 1893
SABIN, ALPHEUS TIMOTHY. Chf. Engr., Louisville & Atlantic R. R. Co., Columbus, Hickman Co., Ky. ....		April 1, 1896
SABIN, LOUIS CARLTON. U. S. Asst. Engr., Jones Bldg., Detroit, Mich. ....	{ Assoc. M.	Oct. 4, 1893
	{ M.	May 7, 1902
SACKETT, JOHN WARREN. U. S. Engr. Office, St. Augustine, Fla. ....		May 2, 1894



## MEMBERS S

Date of Membership.

SAFFORD, ARTHUR TRUMAN. Asst. Engr., The Proprietors of Locks and Canals, 66 Broadway, Lowell, Mass.....	Sept.	6, 1899
SAFFORD, EDWARD STANLEY. Chf. Engr. and Asst. Mgr., San José Min., Milling & R. R. Co., Chihuahua, Mexico.....	Dec.	6, 1882
SAFFORD, VINTON PUTNAM. Mgr., Mex. North. Ry., Escalon, Chihuahua, Mexico .....	July	4, 1894
SAMPLE, JOHN HENDERSON. Asst. Engr., Penn. Co., Granville, Licking Co., Ohio.....	Oct.	6, 1886
SANBORN, FRANK BERRY. Prof. of Civ. Eng., Tufts College, Mass....	Oct.	1, 1902
SANDERSON, JAMES GARDNER. 1530 Sanderson Ave., Scranton, Pa....	July	6, 1881
SARLE, OLIVER PERRY. 146 Westminster St., Providence, R. I. ....	Jan.	2, 1901
SAUNDERS, WILLIAM LAWRENCE. Vice-Pres., The Ingersoll-Sergeant Drill Co., 26 Cortlandt St., New York City .....	Nov.	3, 1886
SAVAGE, HIRAM NEWTON. Engr. in Chg., Sweetwater Dam { Assoc. M.	Mar.	7, 1894
and Sweetwater Water System, National City, Cal.. { M.	Oct.	7, 1896
SAVILLE, CALEB MILLS. Div. Engr., Distrib. Dept., Met. { Assoc. M.	Nov.	6, 1895
Water Board, 1 Ashburton Pl., Boston, Mass. .... { M.	Jan.	2, 1901
SAWYER, EDWARD. 60 Congress St., Boston, Mass. (Res., Newton, Mass.).....	Oct.	2, 1895
SAX, PERCIVAL MOSLEY. Engr. and Contr., 1328 Chestnut { Jun.	Jan.	31, 1893
St., Philadelphia, Pa. .... { Assoc. M.	Jan.	3, 1900
	April	3, 1901
SCAIFE, WILLIAM LUCIEN. Scaife Foundry & Machine Co., Ltd., Pittsburgh, Pa.....	Dec.	3, 1890
SCHALL, FREDERICK EDWARD. Bridge Engr., L. V. R. R., South Bethlehem, Pa.....	Oct.	1, 1902
SCHAUB, JULIUS WILLIAM. Cons. Engr., 1659 Monadnock Blk., { Jun.	Nov.	5, 1884
Chicago, Ill. .... { M.	Oct.	6, 1886
SCHENCK, ARCHIBALD ALEXANDER. Chf. Engr., F. E. & M. V. Ry., 12th and Farnam Sts., Omaha, Nebr .....	Oct.	1, 1890
SCHERMERHORN, LOUIS YOUNGLOVE. Pres., Am. Dredging Co., 510 Mariner and Merchant Bldg., Philadelphia, Pa.....	May	5, 1897
SCHERZER, ALBERT JOHN. Santa Ana, Salvador.....	Jan.	6, 1886
SCHMIDT, MAX EBERHARDT. 45 Broadway, New York City.....	May	7, 1879
R. SCHNEIDER, CHARLES CONRAD. (Vice-President). Vice-Pres., Am. Bridge Co., Pencoyd, Pa.....	Feb.	6, 1884
SCHOFIELD, HIRAM ABIF. Dist. Mgr., Pittsburg Testing Laboratory, Ltd., Room 906, Crozer Bldg., Philadelphia, Pa.....	Oct.	7, 1896
SCHULTZ, ALBERT LOUIS. Mgr., Pittsburg Div., Am. Bridge Co., Pittsburg, Pa.....	Sept.	4, 1901
SCHULTZE, PAUL LOUIS. City Engr., Utica, N. Y. .... { Assoc. M.	Nov.	2, 1898
	June	5, 1901
R. SCHUYLER, JAMES DIX. (Vice-President). Cons. Hydr. Engr., 401 Douglas Blk., Los Angeles, Cal.....	Dec.	6, 1882
SCOTT, ADDISON MOFFAT. Charleston-Kanawha, W. Va. ....	June	2, 1886
SCOTT, ERNEST KAY. Care, Hoover & Mason, 1425 Old Colony Bldg., Chicago, Ill.....	Mar.	2, 1898
SCOVILL, EDWARD TRACY. Dansville, N. Y.....	Sept.	6, 1876



## MEMBERS S

		Date of Membership.
SEAMAN, HENRY BOWMAN. Cons. Engr., 40 Wall St., New York City.....	{ Jun. M. Dec.	June 2, 1886 7, 1887
SEARLES, WILLIAM HENRY. Cons. Civ. Engr., Elyria, Ohio.....		July 2, 1873
SEARS, ALFRED FRANCIS. Portland, Ore.....		June 2, 1869
SEEVER, JOHN WRIGHT. Vice-Pres., The Wellman-Seaver-Morgan Eng. Co., New England Bldg., Cleveland, Ohio.....		Nov. 6, 1901
N. SEDDON, JAMES ALEXANDER. 906 Security Bldg., Chicago, Ill.....		Nov. 2, 1898
SELLERS, COLEMAN. 1301 Stephen Girard Bldg., Philadelphia, Pa.....		May 3, 1876
SENGOKU, MITSUGU. The Kiushiu Ry., Moji, Kiushiu, Japan.....		June 4, 1890
SERGEANT, GEORGE, Jr. Prin. Asst. Engr., Atlantic Ave. Impvt., Long Island R. R., 5 Hanson Pl., Brooklyn, N. Y.....		April 2, 1902
SEYMOUR, HORATIO. Chairman, Mich. Iron & Land Co. (Ltd.), Marquette, Mich.....	{ Assoc. M.	Jan. 8, 1873 April 7, 1880
SHAILER, ROBERT AMES. Pres., Boston Tunnel Constr. Co., 23 Lewis St., East Boston, Mass.....		Mar. 3, 1880
SHANKLAND, EDWARD CLAPP. (E. C. & R. M. Shankland, Civ. Engrs.), 1106 Rookery, Chicago, Ill.....		Feb. 5, 1890
SHANKLAND, RALPH MARTIN. 1106 Rookery Bldg., Chicago, Ill.....		Mar. 1, 1899
SHANKS, THOMAS PEARMAN. Engr.'s and Archt.'s Club, Schurman Bld., Louisville, Ky.....		May 2, 1888
SHANLY, JAMES MOORE. Contr. Engr., 346 Prince Arthur St., Montreal, Que., Canada.....		July 6, 1887
SHAW, GRANVILLE WHEATON. U. S. Asst. Engr., P. O. Box 496, Louisville, Ky.....		Oct. 5, 1887
SHAW, SUMNER FARNHAM. Harrison, Ark.....		Oct. 3, 1894
SHEDD, JOEL HERBERT. Cons. Engr., Providence, R. I.....		Sept. 15, 1869
SHENEHON, FRANCIS CLINTON. U. S. Lake Survey, 33 Campau Bldg., Detroit, Mich.....		May 7, 1902
SHEPARD, DAVID CHAUNCEY. St. Paul, Minn.....		May 2, 1883
SHERMAN, CHARLES WINSLOW. Div. Engr., Sudbury { Dept., Met. Water-Works, 1 Ashburton Pl., Boston, Mass.....	{ Jun. Assoc. M. M.	Oct. 8, 1891 May 2, 1900 Feb. 4, 1903
SHERMAN, HERBERT ELLWOOD. Asst. Engr. in Chg. of Dept. of Street Lines, City Engr.'s Office, Providence, R. I.....		Mar. 7, 1900
SHERMAN, RICHARD WILLETT. Pres., Troy Public Works Co., 1 Mann Bldg., Utica, N. Y.....		Oct. 6, 1886
SHERRED, MORRIS ROBESON. Engr. and Supt., Dept. of Water, 128 Halsey St., Newark, N. J.....	{ Assoc. M. M.	May 3, 1893 May 6, 1896
SHITRAISHI, NAOJI. 71 Miyamura-cho, Azabu, Tokyo, Japan.....		Oct. 4, 1899
SHIRREFS, REUBEN. Hydr. Engr., Great Falls Power Co., Washington, D. C.....		June 4, 1890
SHMELEFF, THEODOR SEMENOVITCH. Engr., Russian Imperial Civ. Service, Novorossüsk (Caucasus), Russia.....		Sept. 7, 1892
SIBERT, WILLIAM LUTHER. Capt., Corps of Engrs., U. S. A., P. O. Box 1240, Pittsburg, Pa.....		June 2, 1897
SIMPSON, GEORGE FREDERIC. Asst. Engr., Rapid Transit R. R. Comm., 189 West 136th St., New York City.....		Mar. 2, 1887
SIMPSON, GEORGE HUME. 6723 McPherson St., Pittsburg, Pa.....		Oct. 6, 1880

## MEMBERS S

	Date of Membership.
SIMS, ALFRED VARLEY. Prof., Civ. Engr., Univ. of Iowa, Iowa City, Iowa.	Mar. 4, 1896
SIMSON, DAVID. Gen. Mgr., Buenos Aires West Ry., P. O. Box 741, Buenos Aires, Argentine Republic.....	Jan. 8, 1902
SINCLAIR, FRANK OSCAR. 106 Colchester Ave., Burlington, Vt.....	Nov. 6, 1901
SJÖSTRÖM, IVAR LUDWIG. Treas., The Lawrence Dye Works } Co., Lawrence, Mass.....	Jun. Sept. 6, 1892 M. Sept. 1, 1897
SKILTON, GEORGE STEELE. Asst. Engr., Dept. of Water Supply, Gas and Electricity of City of New York, Borough of Brooklyn (Res., Rockville Centre, N. Y.).....	Sept. 7, 1881
SKINNER, FRANK WOODWARD. Associate Editor, <i>The Engineering Rec- ord</i> , 114 Liberty St., New York City.....	Sept. 1, 1886
SLATAFER, FELICIAN. Vrs S. Vito 20, Trieste Austria.....	Sept. 15, 1869
SLOAN, DAVID. Chf. Engr. of Constr., Ill. Cent. R. R., 1 Park Row, Chicago, Ill.....	Jan. 1, 1896
SLOCUM, CHARLES MILLS. City Engr.'s Office, Springfield, Mass.....	May 5, 1897
SMITH, ALBERT MATHER. Engr. of Distrib., Consolidated Gas Co. of N. Y., 4 Irving Pl., New York City.....	May 5, 1886
SMITH, AUGUSTUS. Engr. and Contr., 39 Cortlandt St., New York City.....	June 4, 1902
SMITH, BENJAMIN BURGH. Asst. Light House Engr., U. S. Custom House, Charleston, S. C. ....	Nov. 7, 1888
SMITH, EDWIN FOSTER. Cons. Hydr. Engr., 4102 Locust St., Philadel- phia, Pa.....	June 5, 1895
SMITH, EUGENE RAYMOND. Islip, Suffolk Co., N. Y.....	Jun. May 2, 1888 M. May 1, 1901
SMITH, HENRY CLEMENT. Engr., Central Div., P., B. & W. R. R., Media, Pa.....	Oct. 2, 1901
SMITH, HENRY DEWITT. Res Engr., L. & A. R. R. Co., Stamps, Ark..	Dec. 6, 1893
SMITH, JONAS WALDO. Engr. and Supt. East Jersey } Assoc. M. Water Co., 156 Ellison St., Paterson, N. J.....	Oct. 5, 1892 M. April 5, 1899
SMITH, JOSEPH SHUTER. Care, The Smith Constr. Co., Room 1007, Pennsylvania Bldg., Philadelphia, Pa.....	April 1, 1874
SMITH, LEONARD CHARLES LINDSAY. Engr. in Chg. of Water Supply, Borough of Queens, 59 Woolsey St., Long Island City, N. Y....	Mar. 6, 1901
SMITH, MILLER ARMSTRONG. 235 Lincoln Rd., Brooklyn, N. Y.....	Oct. 6, 1886
SMITH, OBERLIN. Pres., Ferracute Machine Co., "Lochwold," Bridge- ton, N. J.....	Sept. 3, 1884
SMITH, T. GUILFORD. Mgr. of Sales, Carnegie Steel Co., Ill. Steel Co. and others, 9 German Ins. Bldg., Buffalo, N. Y.....	Sept. 6, 1871
SMITH, WILLIAM CHARLES. 2010 Terrace Park Ave., St. Paul, Minn....	Sept. 4, 1901
SMITH, WILLIAM SOOY. Stock Exchange Bldg., Chicago, Ill.....	Jan. 17, 1872
SMOOT, EDGAR KENNETH. Concessionario de las obras del Puerto de Manzanillo, Mexico, 40 Montgomery St., San Francisco, Cal..	Feb. 2, 1898
SNOOK, THOMAS EDWARD. 261 Broadway, New York City.....	Mar. 3, 1897
SNOW, CHARLES HENRY. Dean, School of Applied Science, } Assoc. M. New York Univ., New York City.....	Feb. 1, 1893 M. Sept. 2, 1896
SNOW, JONATHAN PARKER. Bridge Engr., B. & M. R. R., Boston, Mass.....	June 3, 1885

## MEMBERS S

Date of Membership.

SNOW, WILLIAM PLINY. Engr. in Chg. of Constr., with Lockwood, Greene & Co., Boston, Mass., 335 Lexington St., Auburndale, Mass. ....	Feb. 5, 1902
SNYDER, CHRISTOPHER HENRY. Mgr., San Francisco Office of Milliken Bros., New York, 410 Rialto Bldg., San Francisco, Cal. ....	Oct. 2, 1901
SNYDER, GEORGE DUNCAN. Care, Jacobs & Davies, 128 } Assoc. M. Broadway, New York City. .... } M.	Nov. 6, 1895 Sept. 4, 1901
SOMERVILLE, ROBERT. Asst. Chf. Engr., Board of Mississippi Levee Comms., Greenville, Miss. ....	June 1, 1887
SONNE, OTTO. (P. O. Box 3051), 68 Devonshire St., Boston, Mass. ....	Sept. 7, 1887
SOOYSMITH, CHARLES. Cons. Engr., Empire Bldg., 71 Broadway, New York City. ....	May 5, 1886
SORZANO, JULIO FEDERICO. Cons. Engr., 33 Broadway, New York City. ....	Sept. 3, 1884
SOULE, HOWARD. Cons. Engr., Syracuse, N. Y. ....	Mar. 17, 1869
SPALDING, FREDERICK PUTNAM. Prof. of Civ. Eng., Univ. of Missouri, Columbia, Mo. ....	Dec. 2, 1891
SPENCER, SAMUEL. 80 Broadway, New York City. ....	Sept. 2, 1885
SPERRY, HENRY MUHLENBERG. Signal Engr. and Agt., The Union Switch & Signal Co., 143 Liberty St., New York City. ....	Nov. 6, 1901
SPICER, VIBE KIERULFF. Signal Engr. and Agt., The Union Switch & Signal Co., 1535 Monadnock Blk., Chicago, Ill. ....	June 5, 1895
SPILSBURY, EDMUND GYBBON. Cons. Engr., 216 West State St., Trenton, N. J. ....	Dec. 7, 1892
SPOONER, ALLEN NEWHALL. Dept. Docks and Ferries, Foot 24th St., East River, New York City. ....	Dec. 5, 1900
SPRING, FRANCIS JOSEPH EDWARD. Mem., Madras Legislative Council; Secy. to Govt. Ry. Dept.; Cons. Engr. to Govt.; Madras Club, Madras, India. ....	Jan. 3, 1894
STAATS, JOHN HENRY. Vice-Pres. and Treas., R. P. & J. H. Staats, Engrs. and Contrs., 29 Broadway, New York City. ....	Mar. 5, 1884
STAATS, ROBERT PARKER. (R. P. & J. H. Staats, Civ. Engrs. and } Jun. Contrs.), 29 Broadway, New York City. .... } M.	Nov. 3, 1875 July 1, 1885
STACPOOLE, STEPHEN WESTROPP. Cons. Engr., 3a Avenida } Assoc. M. de la Libertad No. 5, Orizaba, Vera Cruz, Mexico. } M.	May 6, 1896 Sept. 4, 1901
STALEY, CADY. Care, Case School of Applied Science, Cleveland, Ohio. ....	Mar. 17, 1869
STANFORD, HOMER REED. Civ. Engr., U. S. N., Mare } Jun. Island, Cal. .... } Assoc. M.	Oct. 1, 1890 Nov. 7, 1894
STANFORD, CHARLES WILKINSON. 30 Berkeley Pl., Brooklyn, N. Y. ....	Sept. 4, 1901 May 7, 1890
STANTON, FRANK McMILLAN. Agt. of Copper Mines, Atlantic Mine, Houghton Co., Mich. ....	Feb. 1, 1899
STANTON, ROBERT BREWSTER. Civ. and Min. Engr., Sewickley, Pa. ....	Sept. 1, 1880
STARRETT, MILTON GERRY. Chf. Engr., Met. St. Ry. Co., 621 Broadway, New York City. ....	Jan. 3, 1900
STAUFFER, DAVID MCNEELY. Vice-Pres., Eng. News Pub. Co., St. Paul Bldg., New York City. ....	Sept. 2, 1874

## MEMBERS S

Date of Membership.

<b>N. STEARNS, FREDERIC PIKE.</b> Chf. Engr., Met. Water and Sewerage Board, 1 Ashburton Pl., Boston, Mass.....		Oct.	2, 1878
<b>STEARNS, IRVING ARIEL.</b> Pres., Coxo Bros. & Co. (Inc.); Pres., Del., Susq. & Schuylkill R. R. Co., 143 Liberty St., New York City (Res., Wilkesbarre, Pa.).....		April	2, 1884
<b>STEELE, HENRY MAYNARD.</b> Chf. Engr., Cent. of Ga. Ry. } Assoc. M.		April	5, 1893
Co., Savannah, Ga. .... } M.		Dec.	6, 1899
<b>STEPHENS, CLINTON F.</b> Mgr., Mine La Motte Estate, Mine La Motte, Mo. ....		Sept.	5, 1877
<b>STERN, EUGENE WASHINGTON.</b> Cons. Engr., 1133 Broadway, New York City.....		Mar.	3, 1897
<b>STEVENS, FRANK STODDARD.</b> Supt., Reading and Lebanon Divs., P. & R. Ry., Reading, Pa. ....		Oct.	3, 1883
<b>STEVENS, HORACE EDWARD.</b> Care, Winston Bros. Co., Minne- } Jun.		Nov.	1, 1876
apolis, Minn. .... } M.		April	4, 1888
<b>STEVENS, JOHN FRANK.</b> Chf. Engr., Great Northern Ry., St. Paul, Minn.		June	6, 1888
<b>STEWART, JOHN MUIRHEAD.</b> Asst. Engr., Dept. of Docks and } Jun.		Mar.	2, 1887
Ferries, East 24th St. Office, New York City..... } M.		Jan.	4, 1888
<b>STILLWELL, LEWIS BUCKLEY.</b> Cons. Elec. Engr., Manhattan Ry. Co.; Elec. Director, Interborough Rap. Trans. Co., Park Row Bldg., New York City.....		Oct.	2, 1901
<b>STITES, ARCHER COCHRAN.</b> Care, Joseph T. Ryerson & } Jun.		Dec.	3, 1890
Son, 18 Milwaukee Ave., Chicago, Ill. .... } Assoc. M.		Nov.	4, 1891
..... } M.		May	6, 1896
<b>STODDARD, GEORGE CALEB.</b> Civ. and San. Engr., 215 West 125th St., New York City.....		April	4, 1900
<b>N. STONE, EDWARD HERBERT.</b> Chf. Engr., East Indian Ry., Calcutta, India.....		Dec.	5, 1888
<b>STOREY, WILLIAM BENSON, Jr.</b> Chf. Engr., A., T. & S. F. Ry., Topeka, Kans. ....		Jan.	2, 1889
<b>STOWELL, CHARLES FREDERICK.</b> (Stowell & Cunningham), 51 State St., Albany, N. Y. ....		April	4, 1888
<b>STRACHAN, JOSEPH.</b> Asst. Engr., Bureau of Highways, } Assoc. M.		May	4, 1892
Brooklyn, New York City, 352 Putnam Ave., Brook- } M.		May	4, 1898
lyn, N. Y. ....			
<b>STROBEL, CHARLES LOUIS.</b> Cons. and Contr. Engr., 1744 Monadnock Bld., Chicago, Ill. ....		Dec.	3, 1879
<b>STRONG, MASON ROMEYN.</b> Bridge Engr., Erie R. R. Co., N. Y., S. & W. R. R. Co., 237 Lexington Ave., Passaic, N. J. ....		Mar.	6, 1901
<b>STUART, ALFRED ALLEN.</b> Engr. and Mgr. for M. P. Davis, Contr., Substructure, Quebec Bridge, Sillery, Que., Canada.....		Oct.	7, 1891
<b>STUART, FRANCIS LEE.</b> Asst. Engr., B. & O. R. R. Co., Somerset, Pa.		May	3, 1899
<b>STUBBS, LINTON WADDELL.</b> Asst. Engr., S. P. R. R., Lake Charles, La.		Oct.	3, 1888
<b>STURTEVANT, CARLETON WILLIAM.</b> Engr. with Atlantic, Gulf & Pacific Co., Vicksburg, Miss. ....		Oct.	2, 1901
<b>SUBLETTE, GEORGE WASHINGTON.</b> City Engr., Minneapolis, Minn. ....		Oct.	1, 1902
<b>SULLIVAN, JOHN G.</b> Div. Engr., Constr. Dept., C. P. Ry., Bank of Hamilton Chambers, Winnipeg, Man., Canada .....		Sept.	6, 1899



## MEMBERS S-T

	Date of Membership.	
SUMNER, HORACE AUGUSTUS. Chf. Engr., Denver, N. W. & Pac. Ry., Majestic Bldg., Denver, Colo.....	Oct.	4, 1899
SUNDSTROM, CARL ALFRED. Surv. and Regulator, 8th Survey Dist., Dept. of Public Works, Philadelphia; Office, 4444 Main St., Manayunk, Philadelphia, Pa. ....	Oct.	3, 1894
SUTER, CHARLES RUSSELL. Col., Corps of Engrs., U. S. A., Army Bldg., 39 Whitehall St., New York City.....	April	1, 1896
SUTERMEISTER, ARNOLD HENRY. Engr., Board of Railroad Commrs., 306 Washington Ave., Albany, N. Y.....	June	3, 1902
SWAIN, GEORGE FILLMORE. ( <i>Director</i> ). Prof. of Civ. { Eng., Mass. Inst. Tech.; Engr., Mass. R. R. Comm.; { Assoc. Mem., Boston Transit Comm.; Mass. Inst. Tech., { M. Boston, Mass. ....	Sept. Mar.	5, 1883 2, 1892
SWENSSON, EMIL. Cons. and Constr. Engr., 925 Frick Bldg., Pittsburg, Pa.....	June	7, 1893
SWINBURNE, GEORGE WAY. Civ. and San. Engr., 156 Fifth Ave., New York City.....	May	7, 1902
SYMONS, THOMAS WILLIAM. Maj., Corps of Engrs., U. S. A., 540 Federal Bldg., Buffalo, N. Y.....	Oct.	3, 1894
TALBOT, ARTHUR NEWELL. Prof. of Municipal and San. Eng., Univ. of Illinois, Urbana, Ill.....	April	4, 1888
TALBOTT, HARRY ELSTNER. Civ. Engr. and Gen. Contr., Dayton, Ohio.....	June	6, 1900
TATNALL, GEORGE. Asst. Engr., P., W. & B. R. R. Div., P. R. R., 1411 Harrison St., Wilmington, Del.....	May	3, 1899
TAUSSIG, HUBERT PRIMM. Civ. and Cons. Engr., 1211 Chemical Bldg., St. Louis, Mo.....	Oct.	3, 1894
TAYLOR, EDWARD BALLINGER. Fourth Vice-Pres., Penn. Lines W. of Pitts., Union Station, Pittsburg, Pa.....	Sept.	3, 1884
TAYLOR, HARRY. Capt., Corps of Engrs., U. S. A., U. S. Engr. Office, Boston, Mass.....	Oct.	7, 1896
TAYLOR, JAMES TOWNSEND. Cons. Hydr. Engr., Honolulu, Hawaiian Islands.....	Jan.	3, 1894
TAYLOR, LUCIAN ARNOLD. Cons. Engr., 719 Tremont Bldg., Boston, Mass.....	Nov.	4, 1891
TAYLOR, NORTON LONGSTRETH. City Engr., Tacoma, Wash.....	Feb.	4, 1891
TAYLOR, THOMAS ULYAN. Prof. of Civ. Eng., Univ. of { Texas, Austin, Tex.....	Jan. Oct. Oct.	31, 1893 2, 1895 2, 1901
TAYLOR, WILLIAM DANA. Prof., Railway Eng., Univ. of Wisconsin, 415 Wis. Ave., Madison, Wis.....	Mar.	1, 1899
TAYS, EUGENE AUGUSTUS HOFFMAN. Min. Engr., Fuerte, Sinaloa, Mexico.....	April	6, 1898
TEMPLE, JOHN CHARLES. Cor. Walnut Lane and Green St., German- town, Philadelphia, Pa.....	May	4, 1898
TEMPLE, WILLIAM HENRY GILES. Civ. and Hydr. Engr., 75 Westmin- ster St., Providence, R. I.....	Feb.	3, 1892



# MEMBERS T

		Date of Membership.
TERRY, EDWARD CLINTON.	Hartford, Conn.....	Feb. 6, 1895
THACHER, EDWIN.	Cons. Engr. and Mem., Concrete-Steel Eng. Co., Park Row Bldg., New York City.....	Feb. 17, 1869
THACKRAY, GEORGE EDWARD.	Structural Engr., Cambria Steel Co., Johnstown, Pa.....	Jun. Sept. 6, 1882 M. April 7, 1886
THAYER, RUSSELL.	Pres., Carbon Light Co.; Vice-Pres. and Gen. Mgr., Kitson Ltg. Co.; Address, U. G. I. Co., Broad and Arch Sts., Philadelphia, Pa.....	Dec. 6, 1882
N. THOMAS, BENJAMIN FRANKLIN.	U. S. Asst. Engr., Louisa, Ky.....	April 6, 1887
THOMAS, GEORGE EDWARD.	49 West 94th St., New York City.....	Oct. 5, 1898
THOMPSON, BENJAMIN.	Chf. Engr., Trinity & Brazos Val. Ry., Hills- boro, Tex.....	July 3, 1889
THOMPSON, ELLIS DUNN.	Prin. Asst. Engr., U. S. Engr.'s Office, 815 Witherspoon Bldg., Philadelphia, Pa.....	Feb. 1, 1899
THOMPSON, FRED.	Civ Engr., U. S. N., U. S. Navy Yard, Norfolk, Va.....	Oct. 1, 1902
THOMPSON, GAYLORD.	Gen. Mgr., Beaver Val. Traction Co., Box 643, Beaver, Pa.....	April 2, 1890
THOMPSON, HENRY CLARK.	Div. Engr., N. Y. C. & H. R. R. R. 42 Lorillard Pl., Fordham, New York City.....	Feb. 4, 1903
THOMPSON, SAMUEL CLARENCE.	Engr. of Highways, Borough of the Bronx, New York City.....	Feb. 6, 1889
THOMPSON, WILLIAM ANDREW.	U. S. Asst. Engr., La Crosse, Wis....	Oct. 7, 1896
THOMPSON, WILLIAM GEORGE MCNEILL.	59 James St., St. Catharines, Ont., Canada.....	July 2, 1879
THOMSON, GEORGE HUNTINGTON.	Ossining, N. Y.....	Feb. 2, 1887
THOMSON, JOHN.	253 Broadway, New York City.....	Mar. 2, 1887
THOMSON, THOMAS KENNARD.	Cons. Engr., Park Row { Jun. Bldg., New York City..... { Assoc. M. M. Dec. 4, 1895	
THURSTON, ROBERT HENRY.	Director and Dean of Sibley Coll.; Prof. of Mech. Eng., Cornell Univ., Ithaca, N. Y.....	Dec. 6, 1871
TIBBALS, GEORGE ATTWATER.	The Continental Iron Works { Jun. (Res., 148 Milton St.) Brooklyn, N. Y..... { M. May 2, 1888	
TIBBALS, SAMUEL GAYLORD.	The Continental Iron Works { Jun. (Res., 148 Milton St.), Brooklyn, N. Y..... { M. May 2, 1888	
TILL, JOSEPH.	Engr. in Chg. of Constr., Newton & N. W. Ry., Boone, Iowa.....	May 5, 1897
TILLSON, GEORGE WILLIAM.	Chf. Engr., Bureau of Highways, Bor- ough of Brooklyn, New York City.....	Oct. 4, 1899
TIMONOFF, VSEVOLOD EVGUENIEVITCH.	Prof. of the Inst. of Ways of Communications; Director of Ways and Communications of the Div. of St. Petersburg, Perspective Zabalkanski 9, St. Petersburg, Russia.....	Oct. 7, 1896
TINGLEY, GEORGE CURTIS.	75 Westminster St., Providence, R. I....	May 3, 1893
TINGLEY, RICHARD HODLEY.	Pres. and Chf. Engr., The R. H. Ting- ley Co., Cons. Engrs., 29 Broadway, New York City (also 75 Westminster St., Providence, R. I.).....	Sept. 6, 1871
		April 3, 1901

# MEMBERS T

Date of Membership.

TINKHAM, SAMUEL EVERETT. Asst. Engr., Eng. Dept., City Hall, Boston, Mass.....	Mar. 2, 1892
TINTORER Y GIBERGA, JOSEPH. Chris 32, Barcelona, Spain.....	May 5, 1880
TITTMANN, OTTO HILGARD. Supt., U. S. Coast & Geodetic Survey, Washington, D. C.....	June 4, 1902
TODD, FRANK HERBERT. Cons. Engr. (Sturtevant & Todd), 1208 Fisher Bldg., Chicago, Ill.....	Feb. 6, 1889
TOLLINGER, EDWARD CHANDLER. U. S. Asst. Engr., Greenville, Miss.	June 4, 1902
TOMLINSON, ALFRED THOMAS. Engr. and Supt., J. G. White & Co., 29 Broadway, New York City.....	Sept. 7, 1887
TOMLINSON, SAM. Gresham House, Singapore, Straits Settlements..	April 6, 1892
TOMPSON, GEORGE MORRIS. Parker Rd., Wakefield, Mass.....	May 2, 1888
TONE, SUMNER LA RUE. Second Vice-Pres., Pittsburg Rys. Co., 5607 Howe St., Pittsburg, Pa.....	Dec. 4, 1901
TÖNNESSEN, TOBIAS. Res. Engr., White River R. R. Co. in Mo., Car- thage, Mo.....	May 1, 1901
TOUCEDA, ENRIQUE AUGUSTO. 51 State St., Albany, N. Y.....	Jan. 3, 1900
TOWL, FORREST MILTON. Engr., National Transit Co., 26 Broadway, New York City (Res., 794 Carroll St., Brooklyn, N. Y.).....	Feb. 5, 1896
TOWLE, STEVENSON. Civ. and Cons. Engr., 220 Broadway, New York City.....	Feb. 19, 1868
TOWNSEND, CURTIS McDONALD. Maj., Corps of Engrs., U. S. A., Rock Island, Ill.....	Nov. 1, 1893
TRASK, FRANK ELLSWORTH. Cons. Civ. and Hydr. Engr., { Assoc. M. 405 Douglas Bldg., Los Angeles, Cal..... { M.	June 5, 1895 Jan. 2, 1901
TREADWELL, LEE. U. S. Navy Yard, Portsmouth, N. H.. { Jun. { Assoc. M. { M.	Nov. 5, 1890 Oct. 4, 1893 Dec. 2, 1896
TRIBUS, LOUIS LINCOLN. Cons. Engr. (Tribus & Massa), { Jun. 84 Warren St., New York City; also Commr. of { Assoc. M. Public Works, Borough of Richmond, City of New { M. York.....	April 4, 1888 June 1, 1892 April 1, 1896
TROCON, ALBERT ALEXANDER. (The Midland Bridge Co., Freygang & Trocon, Proprs.), Kansas City, Mo.....	May 1, 1895
TROTTER, ALFRED WILLIAMS. 141 Broadway, New York City... { Jun. { M.	Sept. 5, 1883 Nov. 7, 1894
TRUNDLE, HORATIO HARTLEY. Care, Warner Hotel, Amster- { Assoc. M. dam, N. Y..... { M.	June 7, 1899 Mar. 6, 1901
TUBBS, JOSEPH NELSON. Gen. Insp., State Dept. of Public Works, 207 Wilder Bldg., Rochester, N. Y.....	Sept. 3, 1884
TUCKER, LESTER WALDO. Res. Engr., N. Y. C. & H. R. R. R., Albany, N. Y.....	Dec. 4, 1901
TULLOCK, ALONZO J. Prop., Missouri Val. Bridge & Iron Works, Leav- enworth, Kans.....	June 6, 1883
TURNER, CLAUDE ALLEN PORTER. Cons. Engr. and Archt., 816 Phenix Bldg., Minneapolis, Minn.....	Mar. 6, 1901
TURNER, EDMUND KIMBALL. 53 State St., Boston, Mass.....	Nov. 4, 1891
TURNER, NATHANIEL. 100 Calle de Matamoros, Monterey, Mexico.....	Mar. 6, 1895

## MEMBERS T-V

		Date of Membership.	
TUSKA, GUSTAVE ROBITSCHER. Cons. Engr., 62 William St., New York City.....	Jun.	Mar.	6, 1894
	Assoc. M.	Jan.	1, 1896
	M.	Nov.	2, 1900
TUTEIN-NOLTHENIUS, RUDOLPH PETER JOHANN. Kloppersingel No. 5, Haarlem, The Netherlands.....		Dec.	6, 1899
TUTHILL, JOB. Bridge Engr., Pere Marquette R. R., Detroit, Mich.....	Jun.	June	6, 1888
	M.	Oct.	4, 1893
TUTTLE, ARTHUR SMITH. Prin. Asst. Engr., Board of Estimate and Apportionment, City Hall, New York City.....	Jun.	Mar.	2, 1887
	Assoc. M.	May	2, 1894
	M.	Mar.	2, 1898
TUTTON, CHARLES HAROLD. Asst. Engr., Dept. Public Works, Room 13, City Hall, Buffalo, N. Y.....		Oct.	2, 1901
TUTWILER, THOMAS HENRY. Engr. in Chg., Elec. St. R. R. Constr., Care, Nashville Ry. Co., Nashville, Tenn.....		June	4, 1902
TWYMAN, AARON. Engr., Constr. Dept., The Pullman Co., 6 One Hundred and Twelfth St., Pullman, Ill.....		Mar.	2, 1898
TYE, WILLIAM FRANCIS. Chf. Engr. of Constr., Canadian Pacific Ry., Winnipeg, Man., Canada.....		Sept.	1, 1897
TYSON, ANDERSON HARVEY. Glenridge, N. J.....		Oct.	2, 1889
UPHAM, CHARLES CLIFTON. Vice-Pres. and Gen. Mgr., New York Steam Co., 143 Liberty St., New York City.....		April	7, 1897
VALUE, BEVERLY REID. Engr., Third Div., Rapid Transit R. R. Comm., 231 West 125th St., New York City.....		Jan.	2, 1901
VAN BUREN, JOHN D. Newburgh, N. Y.....		May	20, 1868
VAN BUREN, ROBERT. 58 West Ave., Norwalk, Conn.....		June	17, 1868
VAN DER HOEK, JACOBUS. Div. Engr., Lehigh Val. R. R. Co., Buffalo, N. Y.....		April	7, 1897
		Sept.	2, 1874
VANDERPOOL, EUGENE. Civ. and Cons. Engr., 757 Broad St., Newark, N. J.....		Sept.	2, 1874
VANDEVANTER, CHARLES OSCAR. Engr. in Chg., West. Md. R. R., 523 North Charles St., Baltimore, Md.....		Sept.	2, 1896
VAN HOESEN, EDMUND FRENCH. (Director). Res. Engr., Western Dist., N. Y. C. & H. R. R. R. Co., Buffalo, N. Y.....		July	1, 1891
VAN HORNE, JOHN GARRET. 29 Broadway, New York City.....		Feb.	4, 1880
VAN ORDEN, CHARLES HOPKINS. Catskill, N. Y.....		June	1, 1898
VAN ORNUM, JOHN LANE. Prof. of Civ. Eng., Washington Univ., St. Louis, Mo.....	Assoc. M.	Oct.	3, 1894
	M.	Oct.	4, 1899
VAN SANT, ROBERT LAWRENCE. Civ. Engr. and Contr., Room 55, Third National Bank Bldg., St. Louis, Mo.....		Sept.	3, 1884
VAN WINKLE, EDGAR BEACH. 115 East 70th St., New York City.....		Dec.	2, 1868
VAUGHAN, GEORGE WASHINGTON. Div. Engr., Western Div., N. Y. C. & H. R. R. R., 145 Washington St., Buffalo, N. Y.....	Jun.	Mar.	3, 1886
	M.	Nov.	4, 1896
VAUGHN, GEORGE WASHINGTON. Engr. in Chg., Joint Trunk Elevation, A. T. & S. F. Ry. Co., C. M. & N. R. R. Co. and C. & A. Ry. Co., 2476 Archer Ave., Chicago, Ill.....		June	3, 1891

## MEMBERS V-W

		Date of Membership.	
VIELÉ, MAURICE AUGUSTUS. Civ. and Hydr. Engr., 44 Broad St., New York City.....	Jun.	Feb.	4, 1891
	Assoc. M.	Sept.	7, 1892
	M.	Oct.	6, 1897
VON GELDERN, OTTO. U. S. Asst. Engr., 89 Flood Bldg., San Fran- cisco, Cal.....		May	4, 1892
VON LEER, ISAAC WAYNE. 813 Crozer Bldg., Philadelphia, Pa.....		May	3, 1899
VON SCHON, HANS AUGUST EVALD CONRAD. Chf. Engr., Michigan Lake Superior Power Co., Sault Ste. Marie, Mich.....		Sept.	2, 1902
VOORHEES, THEODORE. First Vice-Pres., P. & R. Ry. Co., Reading Terminal, Philadelphia, Pa.....		May	6, 1885
VORCE, CLARENCE BROWNING. Civ. and Cons. Engr., 80 Pearl St., Hartford, Conn.; also Chf. Engr., Green- wich & Johnsonville Ry.....	Jun.	April	30, 1895
	Assoc. M.	Oct.	7, 1896
	M.	May	2, 1900
WADDELL, JOHN ALEXANDER LOW. (Waddell & Hedrick, Cons. Engrs.), Kansas City, Mo.....		Oct.	5, 1881
WADDELL, MONTGOMERY. Cons. Engr., 135 Broadway, New York City.....	Jun.	Sept.	1, 1886
	M.	Sept.	2, 1896
WADDELL, ROBERT WILLIAM. City Engr., Kansas City, Mo.....		Sept.	4, 1901
WADSWORTH, HENRY HAYES. U. S. Asst. Engr. (Res., 1809 Hughitt Ave.), West Superior, Wis.....		Oct.	2, 1901
WAGNER, SAMUEL TOBIAS. Asst. Engr., P. & R. Ry., 602 Reading Ter- minal, Philadelphia, Pa.....		Feb.	2, 1887
WAINWRIGHT, JONATHAN. 32 South Broad St., Philadelphia, Pa....		Feb.	3, 1892
WAIT, JOHN CASSAN. Attorney and Counsellor-at-Law (Eng. and Arch. Jurisprudence), 220 Broadway, New York City.....		Feb.	3, 1892
WALDO, MARK ALBIGENSE. 226 Third Ave., Leavenworth, Kans .....		May	2, 1900
WALKER, ELTON DAVID. Prof. of Hydr. and San. Eng., The Pennsylvania State Coll., State College, Pa....	Jun.	Oct.	4, 1892
	Assoc. M.	June	1, 1898
	M.	Sept.	5, 1900
WALKER, JESSE WAGER. Room 207, Bissell Blk., Pittsburg, Pa.....		May	7, 1884
WALKER, JOHN SHAW. Office of Chf. Engr. for Existing Lines, West Australia Govt. Rys., Wellington St., Perth, Western Australia .....	Assoc.	May	1, 1894
	Assoc. M.	Mar.	3, 1897
	M.	Mar.	6, 1901
WALKER, JOHN SIMPSON. U. S. Asst. Engr., Nashville, Tenn.....		Jan.	5, 1881
R. WALLACE, JOHN FINDLEY. ( <i>Past-President</i> ). Gen. Mgr., Ill. Cent. R. R. Co., 1 Park Row (Res., 4427 Greenwood Ave.), Chicago, Ill.		June	2, 1886
WALLACE, JOHN HERBERT. Engr., M. of W., S. P. Co. (Pacific System), 4 Montgomery St., San Francisco, Cal.....		Jan.	2, 1890
WALLACE, JOSEPH HARRISON. (Wallace, Jaastad, Drewsen), Temple Court Bldg., New York City .....	Jun.	Dec.	1, 1896
	Assoc. M.	Dec.	1, 1897
	M.	Nov.	6, 1901
WARD, CHARLES DOD. 702 St. Nicholas Ave., New York City.....		Mar.	3, 1869
WARE, REUEL WILLARD. 810 Second Pl., Plainfield, N. J.....		April	1, 1874
WARNER, EDWIN HALL. Clark Ave., Republic, Wash.....	Assoc. M.	May	6, 1891
	M.	Oct.	4, 1893
WARREN, WILLIAM HENRY. Challis Prof. of Eng., Univ. of Sydney, Sydney, New South Wales, Australia .....		Feb.	5, 1890



# MEMBERS W

	Date of Membership.
WASHBURN, FRANK SHERMAN. Cons. Engr., Cole Bldg., Nashville, Tenn.	Nov. 7, 1888
WATERHOUSE, JOHN. Cons. Engr., 29 Broadway, New York City.	Oct. 4, 1899
WATHEN, BENJAMIN SOUTHERN. Chf. Engr., Tex. & Pac. Ry., Dallas, Tex.	Nov. 2, 1892
WATKINS, FREDERICK WILLIAM. Div. Engr., Aqueduct Comm. of New York; Res., 45 Old Spring St., White Plains, N. Y.	Oct. 3, 1883
WATKINS, RICHARD. 8 Mears Ave., Randwick, near Sydney, New South Wales, Australia.	Dec. 3, 1890
WATSON, WILLIAM. Secy., Am. Academy of Arts and Sciences, { 107 Marlborough St., Boston, Mass. .... } Assoc.	Mar. 1, 1882
WATSON, WILLIAM PARSONS. Asst. Engr., Ore. Short Line R. R. Co., 574 West South Temple, Salt Lake City, Utah	Sept. 2, 1891
WATT, DAVID ALEXANDER. U. S. Asst. Engr., Louisa, Ky.	June 1, 1887
WATT, JOHN MARSHALL GILKISON. U. S. Engr. Office, Chattanooga, Tenn.	Feb. 6, 1901
WEBB, GEORGE HERBERT. Room 7, Arcade, Springfield, Ohio.	Feb. 5, 1902
WEBER, ALEXANDER HAMILTON. U. S. Asst. Engr., Board of Engrs. for Rivers and Harbors, Washington Barracks, Washington, D. C.	Feb. 1, 1893
WEBSTER, CHARLES EDWARD. Cons. Engr., Buffalo & Susquehanna R. R., 960 Ellicott Sq., Buffalo, N. Y.	Oct. 3, 1900
WEBSTER, GEORGE SMEDLEY. Chf. Engr. and Surv., { Bureau of Surveys, City Hall, Philadelphia, Pa. .... } Assoc. M.	Oct. 4, 1899
WEBSTER, WILLIAM RICHARDSON. Cons. and Insp. Engr., 411 Walnut St., Philadelphia, Pa.	Sept. 7, 1892
WEGMANN, EDWARD. Div. Engr., Aqueduct Commrs., Katonah, N. Y.	Oct. 4, 1893
WEINHAGEN, FRED. Pres., Wisconsin Bridge & Iron Co., Pabst Bldg., Milwaukee, Wis.	April 5, 1899
WEISKOPF, SAMUEL C. Chf. Engr., Thompson-Starrett Co., { 51 Wall St., New York City. .... } Jun.	Mar. 7, 1888
WELLMAN, SAMUEL THOMAS. Pres., Wellman-Seaver-Morgan Eng. Co., New England Bldg., Cleveland, Ohio.	May 7, 1884
WELLS, CHARLES EDWIN. Div. Engr., Met. Water-Works, 55 Prescott St., Clinton, Mass.	Dec. 5, 1888
WELLS, JAMES HOLLIS. 32 Nassau St., New York City.	July 4, 1888
WENTWORTH, CHARLES CHANCELLOR. Prin. Asst. Engr., Norfolk & West. Ry. Co., Roanoke, Va.	May 7, 1884
WEST, CHARLES HUNTER. Chf. Engr., Mississippi Levee Dist., Greenville, Miss.	Dec. 5, 1888
WESTINGHOUSE, GEORGE, JR. Pittsburg, Pa.	Oct. 5, 1898
WESTON, CHARLES VALENTINE. Cons. and Contr. Engr., (Weston Bros., 711 Merchants' Loan and Trust Bldg.), Chicago, Ill.	Oct. 1, 1902
WESTON, EDMUND BROWNELL. Cons. Engr., 86 Weybosset St., Providence, R. I.	Jan. 7, 1891
WETHERBEE, GEORGE ALBERT. City Engr., City Hall, Malden, Mass.	Sept. 5, 1900
WETHERILL, WILLIAM CHATTIN. Cons. Engr., Empire Zinc Co., 820 Equitable Bldg., Denver, Colo.	Dec. 6, 1882
WHEELER, DANIEL MERRICK. State R. R. Insp., 315 Salisbury St., Worcester, Mass.	April 5, 1893
	Dec. 1, 1886
	Mar. 6, 1901



# MEMBERS W

		Date of Membership.	
WHEELER, EBENEZER SMITH.	U. S. Asst. Engr., Detroit, Mich.....	Nov.	7, 1883
WHEELER, LEVI LOCKWOOD.	Asst. U. S. Engr., Sterling, Ill.....	June	4, 1884
WHEELER, SCHUYLER SKAATS.	Pres., Crocker-Wheeler Co., {	Jun.	Mar. 2, 1887
Ampere, N. J.....	{ M.	Feb.	6, 1889
WHEELER, WILLIAM.	Cons. Civ. Engr., 14 Beacon St., Boston, Mass.	Oct.	4, 1893
WHINERY, SAMUEL.	Cons. Engr., 95 Liberty St., New York {	Jun.	April 1, 1874
City .....	{ M.	May	4, 1881
WHISTLER, THOMAS DELANO.	2 West Biddle St., Baltimore, {	Jun.	Mar. 5, 1884
Md.....	{ M.	May	2, 1888
WHITCOMB, HENRY DONALD.	Richmond, Va.....	Feb.	21, 1872
WHITE, GEORGE HOWARD.	With Worcester Sewer Dept.; Address, 20 Shattuck St., Worcester, Mass. ....	May	2, 1883
WHITE, HENRY FISHER.	Engr., M. of W., C., R. I. & P. Ry., Chicago, Ill.....	Jan.	2, 1890
WHITE, TIMOTHY SIDNEY.	Vice-Pres. and Chf. Engr., Penn Bridge Co., Beaver Falls, Pa.....	April	3, 1889
WHITFORD, REID.	U. S. Asst. Engr., Georgetown, S. C.....	Dec.	2, 1896
WHITNEY, FRANK ORMOND.	Chf. of Surveying, Div. of the Eng. and Street Laying-Out Depts., 25 Old Court House, Boston, Mass.....	{ Jun.	May 3, 1876
		{ M.	Jan. 5, 1887
WHITTEMORE, DON JUAN.	(Past-President). Chf. Engr., C. M. & St. P. Ry. Co., 1100 Old Colony Bldg., Chicago, Ill. (Res. 222 Biddle St., Milwaukee, Wis.).....	July	10, 1872
WHITTEN, NATHAN HOLLIS.	Engr., Holyoke Machine Co., Holyoke, Mass.....	June	7, 1876
WIEST, JULIUS CHRISTIAN.	Chf. Engr., and Contr., Central Div., Nicaragua R. R., Managua, Nicaragua.....	Feb.	5, 1902
WILEY, ANDREW JACKSON.	Chf. Engr., Boise-Payette River Elec. Power Co. and of Crow Creek Dam, Cheyenne, Wyo., Boise, Idaho .....	Dec.	5, 1894
WILEY, WILLIAM HALSTED.	43 East 19th St., New York City.....	Feb.	17, 1869
WILGUS, WILLIAM JOHN.	(Director). Chf. Engr., N. Y. C. & H. R. R., Grand Central Station, New York City. ....	April	1, 1896
WILKINS, WILLIAM GLYDE.	Westinghouse Bldg., Pittsburg, Pa.....	Dec.	4, 1889
WILLARD, JAMES EAGER.	406 Columbia Bldg., Louisville, Ky.....	May	1, 1889
WILLIAMS, CYRUS JOHN RICHARD.	Water Supply Dept., Brisbane, Queensland, Australia.....	Feb.	6, 1901
WILLIAMS, DAVID.	Asst. Engr. B. & M. R. R., St. Johnsbury, Vt....	May	4, 1898
WILLIAMS, EDWARD GILBERT.	Engr. and Supt., The Caribbean Mangnese Co., Colon, Colombia. ....	Feb.	3, 1897
N. WILLIAMS, GARDNER STEWART.	Engr. in Chg. of the {	{ Assoc M.	Oct. 2, 1895
Hydr. Laboratory and Prof. of Experimental Hydraulics, Cornell Univ., 109 Valentine Pl., Ithaca, N. Y.....	{ M.		
WILLIAMSON, FRANCIS STUART.	Cons. Engr., 25 Broad St., New York City .....	Sept.	7, 1887
WILLIAMSON, SYDNEY BACON.	U. S. Asst. Engr., Newport, {	Assoc M.	Jan. 3, 1894
R. I.....	{ M.	Dec.	2, 1896

# MEMBERS W

Date of Membership.

WILLIS, PAUL. Svcy. and Engr., Kenwood Bridge Co., 4740 Lake Ave., Chicago, Ill.....	Oct. 2, 1901
WILSON, CHARLES ALFRED. Chf. Engr., Cin., Ham. & Day. Ry., Cincinnati, Ohio.....	April 1, 1891
WILSON, ELLIOTT HINCKLEY. Civ. and Min. Engr. (Receiver of the Minnie Healey Mine), Butte, Mont.....	Feb. 1, 1888
WILSON, GEORGE LEVERETT. Asst. City Engr., St. Paul, Minn.....	Feb. 5, 1890
WILSON, HENRY WILLIAM. Drexel Bldg., Philadelphia, Pa.....	Sept. 6, 1876
WILSON, HERBERT MICHAEL. Geographer, U. S. Geological Survey, Washington, D. C.....	Sept. 5, 1883
WILSON, WINTER LINCOLN. Asst. Prof. in Chg., Dept. Civ. Eng., Tulane Univ. of La., New Orleans, La.....	Jan. 2, 1890
WIMMER, SEBASTIAN. Assoc. and Superv. Engr., Pitts., Carnegie & West. R. R. and Pitts., Tol. & West. R. R. (Wabash R. R. entry into Pittsburg), 331 Fourth Ave., Pittsburg, Pa.....	May 1, 1901
WINGFIELD, NISBET. City Engr. and Commr. of Public Works, Augusta, Ga.....	Mar. 2, 1881
WISNER, GEORGE MONROE. Asst. Chf. Engr., San. Dist. of Chicago, 1010 Security Bldg., Chicago, Ill.....	May 1, 1895
WISNER, GEORGE Y. Cons. Engr., 39 West Canfield Ave., Detroit, Mich.....	Feb. 4, 1903
WOERMANN, JOHN WILLIAM. U. S. Asst. Engr., Waterway from Chicago to St. Louis, 1637 Indiana Ave., Chicago, Ill.....	April 5, 1876
WOLFEL, PAUL LUDWIG. Chf. Engr., Am. Bridge Co., Pennsylvania Bldg., Philadelphia, Pa.....	Assoc. M. May 1, 1895 M. May 7, 1902 Jun. July 3, 1889 Assoc. M. July 1, 1891 M. Nov. 6, 1895
WOOD, HENRY BEECHER. Asst. Engr., Harbor and Land Comm., Room 134, State House, Boston, Mass.....	April 3, 1895
WOOD, JOSEPH. Second Vice-Pres., Penn. Lines W. of Pitts., Union Station, Pittsburg, Pa.....	April 1, 1874
WOODBURY, CHARLES JEPHTA HILL. Asst. Engr., Am. Telephone & Telegraph Co., 125 Milk St., Boston, Mass.....	Dec. 3, 1884
WOODRUFF, EDWARD LOWREY. Asst. Engr., Ninth Light House Dist., Milwaukee, Wis.....	Oct. 3, 1900
WOODS, HENRY DICKINSON. 99 Highland St., West Newton, Mass.....	Assoc. M. Mar. 1, 1893 M. June 5, 1895
WORCESTER, JOSEPH RUGGLES. Cons. Engr., 53 State St., Boston, Mass.....	Jan. 2, 1895
WORTHINGTON, CHARLES. 244 South Hiland Ave., Pittsburg, Pa.....	Assoc. M. Dec. 1, 1897 M. Nov. 6, 1901
WRIGHT, AUGUSTINE WASHINGTON. Cons. Engr., Pomona, Cal.....	May 5, 1886
WRIGHT, CHARLES HERBERT. Chf. Engr., Brown Hoisting Machinery Co., Cleveland, Ohio.....	Oct. 5, 1892
WRIGHT, EDWARD THOMAS. 226 South Spring St., Los Angeles, Cal..	Feb. 3, 1886
WRIGHT, WILLIS BENTON. Chf. Field Asst., Drainage Comm. of New Orleans, 20 City Hall, New Orleans, La.....	Nov. 3, 1897
WROTNOWSKI, ARTHUR FRANCIS. Hermosillo, Sonora, Mexico.....	July 12, 1877

## MEMBERS Y-Z

		Date of Membership.	
YATES, PRESTON KING.	Supt. for the L. P. & J. A. Smith Co., Contrs., Cleveland, Ohio.....	{ Jun.	June 6, 1883
		{ M.	April 5, 1893
YEATMAN, CHARLES POPE.	Mgr., Barranquilla Ry. & Pier Co., Barranquilla, Colombia.....	Feb.	2, 1887
YEATMAN, MORGAN EDWARD.	Care, S. Pearson & Son, Ltd., 10 Victoria St., London, S. W., England.....	May	4, 1892
YEATMAN, POPE.	Randfontein Estates Gold Min. Co., Ltd., Randfontein, Transvaal, South Africa.....	Oct.	4, 1893
YONGE, SAMUEL HUMPHREYS.	U. S. Asst. Engr. in Chg. of Impvt., James River, Va., and Protection of Jamestown Island, 905½ East Main St., Richmond, Va.....	May	5, 1880
C. YORK, HERBERT WALDO.	Chf. Engr., United Elec. Light & Power Co., 55 Duane St., New York City.....	{ Jun.	May 2, 1888
		{ M.	June 3, 1896
YOUNG, JOHN.	Geneseo, N. Y. ....	Mar.	7, 1888
YOUNG, ROSCOE CYPRIAN.	Chf. Engr., Des Moines, Iowa Falls & North. Ry., Iowa Falls, Iowa.....	Oct.	1, 1902
ZIESING, AUGUST.	Western Mgr. of Am. Bridge Co., 1315 Monadnock Blk., Chicago, Ill.....	Oct.	5, 1898
ZIFFER, EMANUEL A.	Pres. of the Council of Adm. of the Imp. Royal Privileged Lemberg-Czernowitz and Jassy Ry. Co., I Opernring 5, Vienna, Austria.....	June	7, 1893
ZOLLINGER, LUTHER REESE.	Asst. Engr., P. R. R., Altoona, Pa.....	Mar.	6, 1901
ZOOK, MORRIS ALEXANDER.	Plainfield, N. J.....	Oct.	4, 1899

Members, 1 570.

## ASSOCIATE MEMBERS.

[Assoc. M. Am. Soc. C. E.]

		Date of Membership.	
ABELLA, JUAN.	Cons. Engr., Buenos Aires & Belgrano Elec. Tramways Co., 691 Calle Bolivar, Buenos Aires, Argentine Republic.	Jan.	6, 1897
ADAMS, EDWIN GRIGGS, JR.	Cons. Civ. and Mech. Engr. (Adams & Knowles), No. 2, The Bund, Tientsin, China.....	Jan.	1, 1896
ADAMS, JULIUS LE ROY.	Chf. Engr., Hartford, Manchester & Rockville Tramway Co., South Manchester, Conn.....	Jun.	Jan. 4, 1888
		Assoc. M.	April 5, 1899
ADEY, WILLIAM HENRY.	181 Main St., Cohoes, N. Y.....	Jun.	Feb. 4, 1896
		Assoc. M.	Dec. 3, 1902
AFFELDER, LOUIS JACOB.	Contr. Engr., Am. Bridge Co. of N. Y., 826 Frick Bldg., Pittsburg, Pa. (Res., 1211 Sheffield St., Allegheny, Pa.).....	Jun.	Feb. 4, 1896
		Assoc. M.	June 5, 1901
ALBERTSON, CHARLES.	Sub-Agt. and Mgr., Eng. Dept., The Am. Trading Co., 99 Kitamachi, Kobe, Japan.	Jun.	Oct. 1, 1895
		Assoc. M.	Mar. 1, 1899
ALBREE, RALPH.	1115 Market St. (Res., 1112 Western Ave.), Allegheny, Pa.....	Jun.	Oct. 4, 1898
		Assoc. M.	Oct. 1, 1902
ALDEN, CHARLES AMES.	Chf. Draftsman, F., S. & S. Dept., The Pennsylvania Steel Co., Steelton, Pa.....	May	4, 1898
ALDEN, HERBERT CLARENDON.	Asst. Engr., Aqueduct Comm., Jerome Park Reservoir, Kingsbridge, New York City.....	Mar.	1, 1893
ALLAN, ALEXANDER GEORGE.	Res. Engr., A., T. & S. F. Ry., Newkirk, Okla.....	Mar.	6, 1901
ALLEN, FRANK WILLIAM.	5 West 125th St., New York City.....	Jun.	Nov. 3, 1896
		Assoc. M.	May 4, 1898
ALLEN, HENRY CLAYTON.	Res. Engr., Dept., State Engr. and Surv., New York State Canals, Syracuse, N. Y.....	July	1, 1891
ALLEN, WILLIAM ANDREW.	Supt. of Constr., Perth Amboy Plant, Am. Smelting & Refining Co., Maurer, N. J. ....	Feb.	6, 1901
ALLEN, WILLIAM FREDERICK.	Secy. and Treas., Am. Ry. Assoc., Editor and Mgr., <i>Official Railway Guide</i> , 24 Park Pl., New York City.....	Jan.	3, 1900
AMES, GEORGE MARSHALL.	121 Ottawa St., Grand Rapids, Mich.....	June	7, 1899
ANDERSON, DAVID GUY.	U. S. Asst. Engr., Engr. Office, U. S. A., Mobile, Ala.....	Oct.	4, 1899
ANDROS, FREDERIC WILLIAM.	Chf. Engr., Chihuahua & Pacific R. R., Apartado 46, Chihuahua, Mexico.....	Feb.	1, 1899

## ASSOCIATE MEMBERS A-B

	Date of Membership.		
ARANGO, RICARDO MANUEL. Panama, Colombia.....	Sept.	2, 1896	
ARCHER, STEVENSON, JR. Res. Engr., Mo. Pac. R. R., Tallulah, La....	Nov.	3, 1897	
ARMITAGE, GEORGE WASHINGTON. U. S. Asst. Engr., Custom House Bldg., Chattanooga, Tenn.....	April	2, 1902	
ASHBAUGH, LEWIS EUGENE. Asst. Prof. of Civ. Eng., Iowa State Coll., Ames, Iowa.....	Jan.	7, 1903	
ASHBRIDGE, RICHARD I. DOWNING. 710 City Hall, Philadelphia, Pa....	Sept.	3, 1902	
ATKINS, HAROLD BEDFORD. Cons. Engr., 22 William St., New York City.....	April	2, 1902	
AURYANSEN, FREDERICK. Chf. Draftsman, Atlantic Ave. } Jun.	Oct.	5, 1897	
Impvt., L. I. R. R., 44 Court St., Brooklyn, N. Y. } Assoc. M.	Dec.	3, 1902	
AYERILL, FRANK LLOYD. Structural Engr., Office of the Superv. Arch't., U. S. Treasury Dept., Washington, D. C.....	Jan.	6, 1897	
AYLETT, PHILIP. Bridge Engr., Seaboard Air Line Ry., Portsmouth, Va.	June	3, 1896	
AYRES, CLARENCE MORTON. Engr., Central Iron & Coal Co., Tusca- loosa, Ala.....	Oct.	2, 1901	
BAEB, CYRUS CATES. Engr., U. S. Geological Survey, } Jun.	Feb.	2, 1892	
Washington, D. C.....	Assoc. M.	Feb.	3, 1897
BACON, GEORGE MORGAN. 624 Dooly Bldg., Salt Lake City, Utah.....	Dec.	3, 1902	
BAILEY, WILLIAM MELVIN. Engr. for Eastern Expanded Metal Co., Paddock Bldg., Boston, Mass.....	Sept.	5, 1900	
BAIRD, HOWARD CARTER. Asst. Engr., Phoenix Iron Co., } Jun.	June	6, 1893	
Phoenixville, Pa.....	Assoc. M.	Oct.	5, 1898
BAIRD, SAMUEL POND. Supt., Portsmouth St. R. R. Light Co., Portsmouth, Ohio.....	Mar.	1, 1899	
BAKER, ELISHA BROWN. Morgantown, W. Va.....	April	1, 1896	
BAKER, HENRY ERSKINE. Watertown, N. Y.....	May	7, 1902	
BALDWIN, ERNEST HOWARD. Asst. Engr., Met. Water-Works, Oak- dale, Mass.....	May	4, 1898	
BALDWIN, HIRAM ELLSWORTH. 47 Hough Pl., Cleveland, Ohio.....	Jan.	2, 1895	
BANCE, CHARLES WILLIAM. Asst. Engr., Jersey City Water Supply Co., 299 Main St., Paterson, N. J.....	Mar.	5, 1902	
BANKS, JOHN EDWIN. Squad Engr., Am. Bridge Co., Pittsburg, Pa....	June	4, 1902	
BARNES, MORTIMER GRANT. U. S. Junior Engr., R. F. D. No. 2, Geneseo, Ill.....	Nov.	2, 1898	
BARNES, WILLIAM THOMAS. Asst. to Leonard Metcalf, 14 Beacon St., Boston, Mass. (Res., 773 Broadway, South Boston, Mass.).....	Sept.	7, 1898	
BARNETT, ROBERT CRARY. 3023 East 20th St., Kansas City, Mo.....	Dec.	5, 1900	
BARNEY, PERCY CANFIELD. Draftsman in Chg., Dept. of } Jun.	Mar.	3, 1896	
Yards and Docks, Navy Yard, Boston, Mass.....	Assoc. M.	June	5, 1901
BARNESLEY, GEORGE THOMAS. Res. Engr. in Chg. of } Jun.	May	31, 1892	
Constr., Monongahela River Bridge and Pittsburg } Assoc. M.	Mar.	7, 1894	
Terminals, Wabash System, 39 Second Ave., Pitts- burg, Pa.....			
BARR, JOSEPH CARROLL. Contr. Engr. (Barr & Porter), Bank for Savings Bldg., Pittsburg, Pa.....	Jan.	4, 1899	



# ASSOCIATE MEMBERS B

Date of Membership.

BARTRAM, GEORGE CORRIE. Res. Engr., Phoenix Bridge Co., 153 Milk St., Boston, Mass.....	{ Jun. Jan. 31, 1899	
	{ Assoc. M. Sept. 2, 1902	
BASCOM, HARRY FRANKLIN. (Lehr & Bascom), 7 South Seventh St., Allentown, Pa.....	{ Jun. Dec. 5, 1899	
	{ Assoc. M. Sept. 4, 1901	
BASCOM, WESTERN RADFORD. Asst. Engr., Williamsburgh Bridge (Res., 11 West 25th St.), New York City....	{ Jun. Dec. 3, 1891	
	{ Assoc. M. May 5, 1897	
BASINGER, JAMES GARNETT. 243 West 131st St., New York City.....	Oct. 3, 1900	
BAUER, JACOB LOUIS. 68 Bible House, New York City.....	Feb. 5, 1896	
BAUM, GEORGE. Representative, Westinghouse, Church, Kerr & Co., Engrs., P. O. Dunwoody, Ga.....	{ Jun. Jan. 4, 1892	
	{ Assoc. M. Apr. 5, 1899	
BAUSHER, CARMI IRVING. Asst. Engr., B. & C. Dept., The Penna. Steel Co., Steelton, Pa., 136 North 13th St., Harrisburg, Pa.....	Dec. 7, 1898	
BELL, ALFRED CARROLL. Contr. Engr., Wisconsin Bridge & Iron Co., Denver, Colo.....	{ Jun. May 2, 1893	
	{ Assoc. M. Jan. 2, 1901	
BELLOWS, OSCAR FRANCIS. Supt. of Constr., Q. M. Dept., U. S. A., Fort Ontario, N. Y.; Address, 159 East Third St., Oswego, N. Y.....	Dec. 4, 1901	
BENTON, ADRIAN BENONI. Engr. to Peruvian Corporation, Ltd., Lima, Peru.....	Mar. 6, 1901	
BERGENGREN, FRITZ CARL ANDERS GEORG. Cons. Engr., 14 South Market Sq., Harrisburg, Pa.....	Dec. 2, 1896	
BERGER, BERT. Asst. to Theodore Cooper, 35 Broadway, New York City.....	April 5, 1893	
BERLE, KORT. First Asst. Str. Engr., Superv. Archt.'s Office, Treasury Dept., Washington, D. C.....	Dec. 6, 1899	
BETTES, CHARLES ROBERT. Chf. Engr., Queens County Water Co., Far Rockaway, N. Y.....	{ Jun. Oct. 1, 1890	
	{ Assoc. M. June 7, 1893	
BETTS, EDWARD EVERETT. Engr. in Chg., Chickamauga and Chattanooga National Military Park, Chattanooga, Tenn.....	April 5, 1899	
BETTS, ROMEO THOMPSON. Asst. Engr., Dept. Docks and Ferries, Foot of East 39th St., New York City.....	Oct. 3, 1900	
BEUGLER, EDWIN JAMES. Res. Engr., The Boston Terminal Co., Boston, Mass.....	{ Jun. June 12, 1891	
	{ Assoc. M. Feb. 1, 1899	
BISHOP, WILLIAM ISRAEL. Supt., Pittsburg Reduction Co., Massena, N. Y.....	Feb. 6, 1901	
BLANCHARD, MURRAY. Junior Engr., U. S. Lake Survey Office, Campau Bldg., Detroit, Mich.....	April 2, 1902	
BLAND, MILES CARLISLE. Contr. Mgr., Am. Bridge Co. of N. Y., 418 Chamber of Commerce, Cleveland, Ohio.....	Sept. 3, 1902	
BLODGETT, JOHN. Care, Am. Bridge Co., 51st St., Pittsburg, Pa.....	{ Jun. Dec. 4, 1889	
	{ Assoc. M. Jan. 2, 1901	
BOATRIDE, JAMES EDWIN. 190 Convent Ave., New York City.....	{ Jun. Feb. 5, 1895	
	{ Assoc. M. Nov. 3, 1897	
BOECKLIN, WERNER. 413 Sixth St., Brooklyn, N. Y.....	{ Jun. Mar. 1, 1892	
	{ Assoc. M. Dec. 1, 1897	
BOGEN, LOUIS EDWARD. 547 Hale Ave., Avondale, Cincinnati, Ohio.....	{ Jun. April 30, 1895	
	{ Assoc. M. June 4, 1902	
BOGGS, JOHN INNERARITY. 2703 Holmes St., Kansas City, Mo.....	April 3, 1895	

## ASSOCIATE MEMBERS B

		Date of Membership.	
BOILER, ALFRED PANCOAST, Jr.	Engr., Westinghouse, { Jun.	Oct.	2, 1894
Church, Kerr & Co., 8 Bridge St., New York City...	{ Assoc. M.	May	3, 1899
BONNETT, CHARLES PIERRE.	421 Westminster Ave., Eliza- { Jun.	June	2, 1886
beth, N. J. ....	{ Assoc. M.	Mar.	6, 1901
BORIGHT, WILLIAM PARSONS.	3549 North Broad St., Phila- { Jun.	Jan.	2, 1894
delphia, Pa. ....	{ Assoc. M.	Mar.	1, 1899
BOURNE, THOMAS JOHNSTONE.	(S. Pearson & Sons, Ltd.), 10 Victoria St., Westminster, London, S. W., England.....	Feb.	7, 1900
BOWEN, EDMUND IGNATIUS.	Roadmaster, Allegheny Div., Erie R. R. Co., Hornellsville, N. Y. ....	Nov.	1, 1899
BOYD, JAMES CHURCHILL.	Asst. Engr., Bangor & Aroostook { Jun.	Sept.	3, 1895
R. R., Houlton, Me. ....	{ Assoc. M.	May	1, 1901
BRACE, JAMES HENRY.	Care, P., N. Y. & L. I. R. R., 20 West 34th St., New York City.....	Jan.	2, 1901
BRADSHAW, SAM WIGFALL.	Asst. Engr., Estimating Dept., { Jun.	Oct.	2, 1900
Pennsylvania Steel Co., Steelton, Pa. ....	{ Assoc. M.	Feb.	4, 1903
BRANCH, THOMAS PETTUS.	Prof., Civ. Eng., Georgia School of Technology, Atlanta, Ga. ....	Feb.	5, 1902
BRANNE, JOHN SEVERIN.	Structural Engr. with James E. Brooks Co., Cons. Engrs., 45 Broadway, New York City (Res., 145 Chester St., Mt. Vernon, N. Y.).....	Oct.	5, 1898
BRAUNE, GUSTAVE MAURICE.	Engr., Southern Bridge Co., { Jun.	June	2, 1896
Birmingham, Ala. ....	{ Assoc. M.	Sept.	4, 1901
BRAXTON, JAQUELIN MARSHALL.	Box 521, Key West, Fla.. { Jun.	Jan.	5, 1897
	{ Assoc. M.	May	3, 1899
BRENNEKE, WILLIAM GEORGE.	(Brenneke & Fay, Cons. Civ. Engrs.), 1000 Fullerton Bldg., St. Louis, Mo. ....	Mar.	5, 1902
BREKETON, THOMAS JOHN.	Engr., Cumberland Val. R. R., { Jun.	Oct.	7, 1885
Chambersburg, Pa. ....	{ Assoc. M.	June	5, 1895
BRIGHT, CHARLES EDWIN.	9th and Indiana Ave., West Nashville, Tenn. ....	Dec.	3, 1902
BROOK-FOX, EVELYN.	Asst. Engr., East Indian Ry., Care, Grindlay & Co., Calcutta, India .....	Feb.	2, 1898
BROOKS, JOHN PASCAL.	Prof. of Civ. Eng., Coll. of Kentucky, P. O. Box 295, Lexington, Ky .....	April	1, 1896
BROWN, ROBERT KING.	Engr., M. of W., San Pedro, Los Angeles & Salt Lake Ry., Los Angeles, Cal. ....	June	7, 1893
BROWNE, JAMES SIMPSON.	Asst. Engr., N. Y., N. H. & H. R. R., 467 South Terminal Station, Boston, Mass. ....	Oct.	4, 1893
BROWNELL, ERNEST HENRY.	Civ. Engr., U. S. N., Navy Yard, Portsmouth, N. H. ....	Jan.	1, 1896
BROWNING, GEORGE ELLIOT.	Chf. Engr., Cochin Govt., Rose Bank, Trichur, S. India. ....	May	7, 1902
BRYDONE-JACK, ERNEST EDMUND.	Dean of the Eng. Faculty, Univ. of New Brunswick, Fredericton, N. B., Canada.....	Oct.	4, 1899
BRINN, PER.	Care, Am. Bridge Co., 51st St., Pittsburg, Pa .....	Feb.	4, 1903
BRYSON, THOMAS BINES.	2139 Park Row Bldg., New York City.....	Feb.	7, 1900
BURCHARD, ANSON WOOD.	368 Main St., Danbury, Conn. ....	May	3, 1893

# ASSOCIATE MEMBERS B-C

		Date of Membership.
BURDEN, JAMES	3 Locust Ave., Troy, N. Y.....	Feb. 5, 1902
BURDEN, MORTON	Cate, Eng. Dept., Am. Bridge Co., Pittsburg, Pa.....	{ Jun. Feb. 4, 1896 { Assoc. M. Jan. 2, 1901
BURDET, FREDERICK ANDERSON	Cons. Engr., 3 East 33d St., New York City.....	{ Jun. Feb. 2, 1897 { Assoc. M. June 1, 1898
BURNS, CLINTON SUMNER	Civ., Hydr. and San. Engr. (Burns & Mc- Donnell), Postal Telegraph Bldg., Kansas City, Mo.....	Feb. 1, 1899
BURNS, JAMES FERGUSON	Roadmaster, L. & N. R. R., Lebanon, Ky.....	{ Jun. Oct. 1, 1895 { Assoc. M. Sept. 6, 1899
BURNS, JUSTIN	Hankow-Canton Ry., Am. China Development Co., Canton, China.....	April 6, 1898
BUSH, EDWARD WALLACE	Asst. Engr., Conn. River Bridge and High- way Dist. Comm., Aetna Life Bldg., Hartford, Conn.....	April 5, 1899
BUTTS, EDWARD PONTANY	Chf. Engr., Am. Writing Paper Co., Hol- yoke, Mass. (Res., Springfield, Mass.).....	Feb. 2, 1898
CAMPBELL, ALBERT JOHNSTONE	Broad St. Ave., London, E. C., England	May 2, 1894
CARLILE, THOMAS JENKS	Asst. Engr., Bureau of Surveys, ( Jun. 4215 Chestnut St., Philadelphia, Pa.....	Mar. 3, 1896 { Assoc. M. Mar. 6, 1901
CARR, ALBERT	Engr., First Div., Rapid Transit Comm., 13 Astor Pl., New York City (Res., 68 Carnegie Ave., East Orange, N. J.)....	Mar. 2, 1892
CARTER, ALFRED ELLSWORTH	Columbia Univ., New York City.....	June 4, 1902
CARTER, RICHARD WILLIAM	Asst. Engr., Mo. Valley Bridge & Iron Works, 1000 South 4th St., Leavenworth, Kans.....	Oct. 1, 1902
CARTER, SHIRLEY	Norfolk, Va.....	{ Jun. May 31, 1892 { Assoc. M. Oct. 5, 1898
CARTER, WILLIAM J.	City Engr., (Res., 2042 Woodland Hills Ave.), Cleveland, Ohio.....	{ Jun. Feb. 5, 1895 { Assoc. M. Sept. 7, 1898
CHAMBERS, FRANK TAYLOR	Civ. Engr., U. S. N., U. S. Navy Yard, Philadelphia, Pa.....	April 6, 1898
CHAMBERS, HERBERT JAMES	Contr. Engr. with Milliken Bros., 11 Broadway (Res., 600 West 114th St.), New York City.....	Nov. 5, 1902
CHAMBERS, RALPH HAMILTON	(Chambers & Hone), 60 New St., New York City.....	Dec. 1, 1897
CHAPLEAU, SAMUEL JEFFERSON	Asst. Engr., Dept. of Public Works, Ottawa, Ont., Canada.....	May 1, 1901
CHARLSWORTH, WILLIAM SAXON	Engr., Opotiki County Council, Opo- tiki, Auckland, New Zealand.....	Nov. 1, 1899
CHASE, RICHARD DAVENPORT	With Allen Hazen, Cons. ( Jun. Engr., 220 Broadway, New York City.....	Oct. 5, 1897 { Assoc. M. Oct. 3, 1900
CHESTER, CHARLIE ELLSWORTH	Shelbyville, Ill.....	May 4, 1898
CHRISTIAN, GEORGE LYON	Asst. Engr., Bureau of Sewers, East 177th St. and 3d Ave. (Res., East 238th St., Woodlawn), New York City.....	Mar. 6, 1895
CHRISTY, GEORGE LEWIS	128 West 42d St., New York ( Jun. City.....	June 6, 1893 { Assoc. M. Nov. 4, 1896
CLAPP, GEORGE HUBBARD	Chairman, Pittsburg Testing Laboratory, Ltd., 325 Water St., Pittsburg, Pa.....	July 1, 1891

## ASSOCIATE MEMBERS C

	Date of Membership.	
CLARK, EDWIN. Structural Engr. and Bldg. Insp., Room 317, City Hall, Bureau of Bldg. Inspection, Philadelphia, Pa.....	Jan.	6, 1897
CLARK, GEORGE HALLETT. Senior Asst. Engr., Rapid Transit R. R. Comm., 13 Astor Pl., New York City.....	Jun. } Assoc. M.	Oct. 3, 1893 April 6, 1898
COATES, FRANK RAYMOND. Chf. Engr., Chic. Gt. West. Ry., St. Paul, Minn.....		Jan. 3, 1900
COLE, BURT. Engr., Consolidated Coal Co. of St. Louis, 164 Laclede Bldg., St. Louis, Mo.....		Jan. 2, 1901
COLEMAN, FREDERICK ALBERT. Supt., Valley Coal & Coke Co.; Supt., Belington & Northern R. R. Co., Belington, W. Va.....	Jun. } Assoc. M.	April 4, 1893 April 5, 1899
COLEMAN, HENRY FITCH. 629 Real Estate Trust Bldg., Philadelphia, Pa.		Mar. 6, 1895
COLLIER, BYRAN CHEVES. Asst. Engr., Dept. of Highways (Res., 2788 Bainbridge Ave., Bedford Park), New York City.....		Oct. 3, 1900
COLLINS, CLARKE PELEG. Chf. Engr., Somerset Coal Co., Somerset, Pa.		June 4, 1902
COMSTOCK, CHARLES WORTHINGTON. Prof. of Min. Eng., Colorado School of Mines, Golden, Colo.; Address, 76 Grant Ave., South Denver Station, Denver, Colo..	Jun. } Assoc. M.	April 5, 1892 Feb. 7, 1900
CONGER, ALGER ADAMS. Asst. Engr., Michigan Lake Superior Power Co., Sault Ste. Marie, Mich.....		Oct. 1, 1902
CONKLING, LEON DE VERE. City Engr., Elmira, N. Y.....		Dec. 4, 1901
CONNOR, WILLIAM DURWARD. 1st Lieut., Corps of Engrs., U. S. A., U. S. Engr. Office, New London, Conn.....		Jan. 7, 1903
CONSTANT, FRANK HENRY. Prof. of Structural Eng., Univ. of Minnesota, Minneapolis, Minn.....		Dec. 2, 1896
CONVERSE, WILLIAM HASSON. Pres., Converse Bridge Co., Chattanooga, Tenn.....		Jan. 6, 1892
COOK, JOHN HENRY. Hydr. Engr., Society for Establishing Useful Manufactures, 158 Ellison St., Paterson, N. J.....		May 4, 1898
COOLEY, MAURICE WURTZ. Mgr., The National Contr. Co., 70 Kilby St., Boston, Mass.....		Mar. 7, 1894
COOMBS, ROBERT DUNCAN, Jr. Chf. Draftsman, B. & C. Dept., Penna. Steel Co., Steelton, Pa.....	Jun. } Assoc. M.	May 2, 1899 Feb. 7, 1900
CORBY, CHARLES EDWARD. In Chg. of Drafting Room, Met. St. Ry. Co., 822 Putnam Ave., Brooklyn, N. Y.....		Oct. 4, 1893
CORNELL, DOUGLAS. Structural Engr., Bureau of Bldg., 1 Municipal Bldg., Buffalo, N. Y.....		Sept. 6, 1899
CORNER, CHARLES. Dist. Engr., Rhodesia Rys., Gwelo, Rhodesia, South Africa.....		May 1, 1895
CORNING, DUDLEY TIBBITS. Johnstown, Pa.....		Oct. 1, 1902
CORTI, JOSEPH JAMES. Casilla Correa 68, Mendoza, Argentine Republic.....		Jan. 1, 1896
CORY, HARRY THOMAS. Prof. of Civ. Eng., and Dean, Coll. of Eng., Univ. of Cincinnati, Cincinnati, Ohio....	Jun. } Assoc. M.	June 20, 1893 Mar. 7, 1900
COSMUS, JOHN ALBERT. Special Agt., Continental Fire Ins. Co., P. O. Box 124, Albany, N. Y.....		June 3, 1896
COVERDALE, WILLIAM HUGH. Asst. Engr., J. G. White & Co., 29 Broadway, New York City.....	Jun. } Assoc. M.	Jan. 2, 1894 Oct. 3, 1900



# ASSOCIATE MEMBERS C-D

	Date of Membership.	
COWPER, JOHN WHITFIELD. Supt., Constr. Dept., The British Westinghouse Elec. & Mfg. Co., 2 Norfolk St., Strand, London, England. . . . .	} Jun. Assoc. M.	June 21, 1894 Oct. 2, 1901
COX, LEONARD MARTIN. Civ. Engr., U. S. N., Naval Station, Guam, La Trone Islands. . . . .		Oct. 4, 1899
CRABBS, CLARENCE LINCOLN. Asst. Supt., Moline Plow Co., 1619 Sixth Ave., Moline, Ill. . . . .		May 1, 1895
CRAIG, WASHINGTON RIGHTER. Res. Engr., Pitts., Shaw- mut & Northern R. R. Co., Bolivar, N. Y. . . . .	} Jun. Assoc. M.	May 1, 1894 Oct. 1, 1902
CRANE, CLARENCE AUSTIN. Asst. Engr., Aqueduct Comm., Jerome Park Reservoir, Kingsbridge (Res., 121 West 70th St.), New York City. . . . .		Mar. 5, 1902
CRESSON, BENJAMIN FRANKLIN, Jr. Asst. Engr., Penn., N. Y. & L. I. R. R. Co., 227 West 33d St., New York City. . . . .		April 2, 1902
CUDDEBACK, ALLAN WINTER. Asst. Engr., Passaic Water Co., Paterson, N. J. . . . .		April 5, 1899
CUDWORTH, FRANK GRANT. Asst. Engr., Manhattan Elev. Ry. Co., 195 Broadway, New York City (Res., Stewart and Bay Ridge Aves., Brooklyn, N. Y.). . . . .		Jan. 3, 1900
CUNNINGHAM, JOSEPH HOOKER. Civ. and Hydr. Engr., Chamber of Commerce, Portland, Ore. . . . .		Sept. 6, 1899
CUSHING, ROBERT DELANO. Lunenburg, Mass. . . . .		Sept. 6, 1899
DALRYMPLE, FRANCIS WHARTON. City Engr., City Hall, Jamestown, N. Y. . . . .		Feb. 7, 1894
DANA, RICHARD TURNER. R. R. Location and Gen. Eng., Room 206, Bennett Bldg., New York City. . . . .	} Jun. Assoc. M.	Sept. 11, 1900 Feb. 4, 1903
DAVIS, ARTHUR LINCOLN. Asst. to Pres, Am. Bridge Co. of N. Y., 100 Broadway, New York City. . . . .		April 4, 1893 Oct. 7, 1896
DAVIS, CARLETON EMERSON. Res. Engr., Cedar Grove Reservoir, Dept. of Water, Newark, N. J. . . . .		April 6, 1898
DAVIS, FRED RUFUS. Res. Engr., Indiana Branch, Buffalo, Rochester & Pitts. Ry. Co., Juneau, Pa. . . . .		Nov. 5, 1902
DAVIS, HAROLD. 1457 Staughton St., N. W., Washington, D. C. . . . .		Oct. 2, 1901
DAVIS, LEONARD HENRY. Chf. Asst. Engr., The Lake Superior Power Co., Sault Ste. Marie, Ont., Canada. . . . .		Nov. 5, 1902
DAVIS, WILLIAM RUSSELL. Chf. Bridge Designer and Insp., Office of State Engr. and Surv. of New York, State Hall, Albany, N. Y. . . . .		May 2, 1900
DAY, EDWARD BLISS. Office Engr., Burlington's Mo. Lines, Room 610, Globe-Democrat Bldg., St. Louis, Mo. . . . .		Feb. 4, 1903
DEANS, CHARLES HERBERT. 130 Water St., New York City. . . . .	} Jun. Assoc. M.	Dec. 3, 1890 May 6, 1896
DE FOREST, GEORGE THOMPSON. De Freestville, N. Y. . . . .		Dec. 4, 1895
DERLETH, CHARLES, Jr. Prof. of Civ. Eng., State Univ. of Colorado, Boulder, Colo. . . . .	} Jun. Assoc. M.	Feb. 1, 1898 Mar. 5, 1902
DESPARD, DUNCAN LEE. 2125 Delancey St., Philadelphia, Pa. . . . .		Feb. 3, 1897
DE WITT, ELMORE. Civ. Engr. for The Pennsylvania Steel Co. (Res., 348 Spruce St.), Steelton, Pa. . . . .		Oct. 5, 1898
DIEHR, ALVAH BENJAMIN. U. S. Insp., Breakwater, P. O. Box 2146, San Pedro, Cal. . . . .		Nov. 5, 1902



# ASSOCIATE MEMBERS D-E

Date of Membership.

DILLON, FRANCIS HENRY. Civ. Engr. and Contr. (Mackin & Dillon), Apartado 221, Monterey, Nuevo Leon, Mexico.....	Oct.	3, 1900
DIMON, DANIEL YOUNG. Asst. Engr., Am. Bridge Co., Eng. Dept., Pencoyd, Pa. (Res., 235 Rochelle Ave., Wissahickon, Philadelphia, Pa.).....	Oct.	2, 1901
DINGLE, JAMES HERVEY. City Surv., Charleston, S. C....	{ Jun. April 30, 1895	
	{ Assoc. M. Oct.	4, 1899
DOEBLER, VALENTINE SHERMAN. Supt., Transportation, Cam. Steel Co., Johnstown, Pa.....	Dec.	6, 1893
DONHAM, BENJAMIN CURTIS. Chf. Engr., Collbran & Bostwick, Ry. and Gen. Contrs., Seoul, Corea.....	Jan.	2, 1901
DORRANCE, WILLIAM TULLY. With Westinghouse, Church, Kerr & Co., Maritime Bldg., New York City.....	Sept.	4, 1901
DOWNMAN, JULIAN ROMNEY. 501 Hennen Bldg., New Orleans, La...	Dec.	4, 1901
DRAKE, ROBERT MORRIS. Asst. Res. Engr., S. P. Co., 3d and Townsend St. Depot, San Francisco, Cal.....	Mar.	7, 1900
DU BOIS, JULIAN. Supt., Amsterdam St. R. R. Co., Amsterdam, N. Y.	Jan.	8, 1902
DUFOUR, FRANK OLIVER. Prof. of Civ. Eng., Univ. of Cincinnati, Cincinnati, Ohio.....	{ Jun. Dec. 5, 1899	
	{ Assoc. M. Oct.	1, 1902
DUNN, EMMETT CLARKE. City Engr., Alexandria, Va.....	Nov.	4, 1891
EASTWOOD, JOHN THOMPSON. First Asst. Engr., Sewerage, { Sewerage and Water Board, 602 Carondelet St., New Orleans, La.....	{ Jun. Mar. 6, 1894	
	{ Assoc. M. Feb.	1, 1899
EAVENSON, HOWARD NICHOLAS. Chf. Engr., United States Coal & Coke Co., Tug River, McDowell Co., W. Va.....	Mar.	6, 1901
EDDY, HARRISON PRESCOTT. Supt. of Sewers (Res., 11 Dean St.), Worcester, Mass.....	May 7, 1902	
EDEK, HENRY JAMES. Palmira Cauca, Colombia.....	{ Jun. June 5, 1894	
	{ Assoc. M. Sept.	1, 1897
EDWARDS, FREDERICK. Instr., Civ. Eng. and Math., Union Coll., Schenectady, N. Y.....	{ Jun. Jan. 31, 1899	
	{ Assoc. M. Feb.	5, 1902
EDWARDS, WARRICK RIGELEY. Asst. to Engr. of Bridges and Bldgs., B. & O. R. R. Co., Mt. Royal Station, Baltimore, Md.....	April 4, 1900	
EHLE, BOYD. Res. Engr., Susquehanna Power Scheme, McCalls Ferry, York Co., Pa.....	Jan.	3, 1894
ELLIOTT, JAMES RUTHERFORD. Care, Elliott & Baton, 1305 Keystone Bldg., Pittsburg, Pa.....	Sept.	4, 1901
ELLIOTT, JOHN STUART. Civ. and Min. Engr., 59 Pine St., New York City.....	April 6, 1892	
ENDEMANN, HERMAN KARL. Asst. Engr., Topographical Bureau, Borough of Queens, Hackett Bldg., Long Island City, N. Y.....	Mar.	6, 1901
ENGSTRÖM, FRANS. Engr. of Inspection, James Stewart & Co. (Res., 3721 Bouquet St.), Pittsburg, Pa.....	May 4, 1892	
EVANS, JOHN MAURICE. Insp. of Erection, New East River Bridge, 598 Bedford Ave., Brooklyn, N. Y.....	{ Jun. May 4, 1897	
	{ Assoc. M. Jan.	3, 1900
EVANS, MYRON EDWARD. Archt. and Engr. (Ballantyne & Evans), 20 Nassau St., New York City.....	{ Jun. Jan. 3, 1895	
	{ Assoc. M. Feb.	7, 1900

# ASSOCIATE MEMBERS E-F

		Date of Membership.	
EVANS, PETER PLATTER.	Comr. Engr., The Osborn Eng. Co., Osborn Bldg., Cleveland, Ohio.....	{ Jun. Feb. 6, 1894 Assoc. M. Mar. 7, 1900	
FAIN, JAMES RHEA.	2132 South Broad St., Philadelphia, Pa.....	June 4, 1902	
FAIRCHILD, JOHN FLETCHER.	Bank of Mt. Vernon Bldg., Mt. Vernon, N. Y.....	{ Jun. April 5, 1892 Assoc. M. Dec. 4, 1895	
FARLEY, PHILIP PATRICK.	Asst. Engr., N. Y. Rapid Transit Comm., 13 Astor Pl., New York City (Res., 980 DeKalb Ave., Brooklyn, N. Y.).....	{ Jun. Oct. 31, 1893 Assoc. M. Mar. 6, 1901	
FAIRQUHAR, HENRY STILSON.	506 Hale Bldg., Philadelphia, Pa.....	{ Jun. April 5, 1892 Assoc. M. Nov. 4, 1896	
FAY, EDWARD BAYRD.	(Brenneke & Fay, Cons. Civ. Engrs.), 1000 Fullerton Bldg., St. Louis, Mo.....	Jan. 8, 1902	
FAY, FREDERIC HAROLD.	Asst. Engr., Eng. Dept., 60 City Hall, Boston, Mass.....	{ Jun. Oct. 2, 1894 Assoc. M. April 2, 1902	
N. FENKELL, GEORGE HARRISON.	Civ. Engr. to Commrs. of Water-Works, Water Office, Erie, Pa.....	{ Jun. Jan. 3, 1899 Assoc. M. Oct. 1, 1902	
FERGUSON, JOHN NEIL.	Asst. Engr., Met. Water-Works, 1 Ashburton Pl., Boston, Mass.....	Oct. 2, 1901	
FERRIS, FREDERICK EDWARD.	Surv., Eng. Bureau, Room 21, City Hall, Jersey City, N. J.....	June 1, 1898	
FICKES, EDWIN STANTON.	Chf. Engr. and Purchasing Agt., Pittsburg Reduction Co., Pittsburg, Pa.....	{ Jun. Jan. 4, 1898 Assoc. M. Feb. 6, 1901	
FISH, JOHN CHARLES LOUNSBURY.	Assoc. Prof. Civ. Eng., P. O. Box 20, Palo Alto, Cal.....	{ Jun. Jan. 31, 1893 Assoc. M. Feb. 7, 1900	
FITZGERALD, CHRISTOPHER COLUMBUS.	Roadmaster, Cincinnati Div., C., N. O. & T. P. Ry. Co., Lexington, Ky.....	Oct. 2, 1901	
FLINN, ALFRED DOUGLAS.	Managing Editor, <i>The Engineering Record</i> , 114 Liberty St., New York City.....	Dec. 6, 1899	
FLYNN, JOHN, JR.	Elec. and Civ. Engr., 83 Third St., Troy, N. Y....	Jan. 8, 1902	
FOCHT, LOUIS.	Engr. to the State Board of Assessors, Trenton, N. J.; Chf. Engr., Carteret Constr. Co., Carteret, N. J. (Res., 105 East Hanover St., Trenton, N. J.).....	May 4, 1892	
FORD, FREDERICK LUTHER.	City Engr., City Hall, Hartford, Conn....	Oct. 1, 1902	
FORD, ROBERT HENRY PERSSE.	Asst. Engr., Cent. Vt. Ry., St. Albans, Vt.....	{ Jun. Mar. 2, 1897 Assoc. M. June 7, 1899	
FORT, EDWIN JOHN.	Dept. of Highways, Municipal Bldg., Brooklyn, N. Y.....	April 1, 1896	
FORTIN, SIFROY JOSEPH.	Representing Milliken Bros., City of Mexico, Mexico.....	Nov. 6, 1895	
FOSTER, THOMAS J.	Vice-Pres. and Mgr., National Bridge Supply Co., 116 Nassau St., New York City.....	Feb. 1, 1899	
FOX, WALTER GORDON.	Div. Engr., White River Ry., McBee Land- ing, Marion Co., Ark.....	Jan. 2, 1901	
FOTE, ANDREW ERNEST.	11 Broadway, New York City.....	{ Jun. May 2, 1893 Assoc. M. Nov. 4, 1896	
FRANCIS, WALTER JOSEPH.	Engr. of Hydr. Locks, Trent Canal, Peter- borough, Ont., Canada.....	May 1, 1901	

# ASSOCIATE MEMBERS F-G

	Date of Membership.
FRAZEE, JOHN HATFIELD. 516 West 183d St., New York City.....	Dec. 6, 1899
FREITAG, JOSEPH KENDALL. New England Agt., Hecla Iron Works, 166 Devonshire St., Boston, Mass.....	Jan. 3, 1900
FRENCH, ARTHUR WILLARD. Prof. of Civ. Eng., Worcester Polytechnic Inst., Worcester, Mass.....	April 4, 1900
FRENCH, FRANK CHAUNCEY. Humboldt, Iowa.....	Dec. 3, 1902
FREW, ROBERT DICKSON ALISON. Chelmer, near Brisbane, Queens- land, Australia.....	June 1, 1898
FRICK, WALTER. Supt. and Engr., Consolidated Water Supply Co., Carbondale, Pa.....	Dec. 2, 1896
FRINK, FRED GOODRICH. Inst. in Civ. Eng., Univ. of Michigan, 1218 Washtenaw Ave., Ann Arbor, Mich.....	May 3, 1899
FROST, GEORGE SHERMAN. Asst. Engr., Rapid Transit { Jun. R. R. Comm., 147 Columbus Ave., New York City.. { Assoc. M.	April 2, 1901 Jan. 7, 1903
FULLER, GEORGE WARREN. (Rudolph Hering & George W. Fuller, Hydr. and San. Engrs.), 170 Broadway, New York City.....	Mar. 1, 1899
GARDINER, FREDERICK WILLIAM. Asst. Engr., Manhattan Ry. Co., 195 Broadway, New York City.....	Dec. 6, 1899
GARRETT, JOHN THOMAS. Bridge Engr., 715 Locust St., St. Louis, Mo.	May 1, 1901
GARRETT, ROBERT PEEL. Civ. Engr. of Board of Public { Jun. Impvts., 301 New City Hall, St. Louis, Mo..... { Assoc. M.	Jan. 4, 1898 Oct. 2, 1901
GARRISON, FRANK LYNWOOD. Min. Engr., 1019 Clinton St., Philadel- phia, Pa.....	Sept. 7, 1892
GESSNER, GUSTAVUS ADOLPHUS, JR. Asst. Engr., Riggs & Sherman, Civ. and Cons. Engrs., 613 The Nasby, Toledo, Ohio.....	April 2, 1902
GIDEON, ABRAHAM. Asst. Engr. for Westinghouse, Church, Kerr & Co., 27 Schnirel Bldg., Geneva, N. Y.....	Sept. 3, 1902
GIFFORD, LESTER ROBINSON. Office of Structural Engr., { Jun. Cambria Steel Co., Johnstown, Pa..... { Assoc. M.	Mar. 3, 1896 Dec. 3, 1902
GILKEY, THOMAS ALVIN. With Pennsylvania Eng. Works, New Castle, Pa.....	Oct. 3, 1900
GILLESPIE, RICHARD HENWOOD. Asst. Engr., Bureau of Highways, Bronx (Res., 2768 Bainbridge Ave.), New York City.....	Oct. 3, 1900
GODDARD, LESLIE WARREN. U. S. Asst. Engr., Grand Rapids, Mich..	Mar. 2, 1892
GOLDSMITH, NATHANIEL OLIVER. Chf. Engr., The Weir Frog { Jun. Co.; Secy. and Treas., The Am. Coke Drawer Co., { Assoc. M. Cincinnati, Ohio.....	June 2, 1886 June 6, 1900
GOWEN, SUMNER. Asst. Engr., Phoenix Bridge Co., { Jun. Phoenixville, Pa..... { Assoc. M.	May 2, 1899 June 4, 1902
GRANDY, ALBION LORENZO. Supervisor, Erie R. R. Co.; Address, 217 Spicer St., Akron, Ohio.....	April 4, 1900
GRANT, THOMAS HENRY. Red Bank, N. J.....	May 6, 1891
GRAVELLE, ALVIN. Estimating Dept., Am. Bridge Co., Van Buren and Clark Sts., Chicago, Ill.....	Nov. 6, 1901
GRAY, EDWARD, JR. City Hall, Richmond, Va.....	Jan. 2, 1895
GRAY, WILLIAM. Asst. Engr., Bureau of Sewers, Borough { Jun. of Bronx, New York City..... { Assoc. M.	May 2, 1888 Mar. 1, 1893

# ASSOCIATE MEMBERS G-H

	Date of Membership.
GREEN, ANDREW H. 403 La Salle Ave., Chicago, Ill.....	Oct. 2, 1901
GREEN, RUTGER BLEECKER. Civ. Engr., The Solvay Process Co., Detroit, Mich.....	Jun. May 5, 1896
	Assoc. M. Oct. 5, 1898
GREENALCH, WALLACE. Deputy City Engr., Albany, N. Y. { Jun. April 3, 1894	
	Assoc. M. June 7, 1899
GREENE, CARLETON. (Greene & Greene, Cons. Engrs.), 11 Broadway, New York City .....	Mar. 3, 1897
GREENE, FREDERICK STUART. 336 West 95th St., New York City.....	June 7, 1899
GREENE, HOWARD ARNOLD. Div. Erecting Mgr., Am. Bridge Co. of N. Y., Pittsburg, Pa.....	June 5, 1895
GREENE, ROBERT MAXSON. 387 Herkimer St., Brooklyn, N. Y.....	June 1, 1898
GREGORY, CHARLES EMERSON. 2471 Davidson Ave., New York City.....	Jun. Oct. 6, 1896
	Assoc. M. Mar. 6, 1901
GREGORY, JOHN HERBERT. Div. Engr., Jersey City Water Supply Co., 299 Main St., Paterson, N. J.....	Jun. Jan. 3, 1899
	Assoc. M. April 3, 1901
GRIFFITH, LAWRENCE. Engr., M. of W., Grand Central Station and Harlem Line, Grand Central Station, New York City (Res., 7 Lincoln Terrace, Yonkers, N. Y.).....	May 2, 1900
GRISWOLD, RAY ELLIOTT. Care, The Barber Asphalt Paving Co., 11 Broadway, New York City.....	Oct. 1, 1902
GROSS, DANIEL WINGERD. Div. Engr., Schenectady Ry. Co., Ballston, N. Y.....	May 1, 1901
GUBELMAN, FREDERICK JOSEPH. Vice-Pres. and Chf. Engr., The T. A. Gillespie Co., 71 Broadway, New York City.....	Oct. 2, 1895
GUDEWILL, CHARLES EDWARD. Vice-Pres., Montreal Pipe Foundry Co., P. O. Box 2304, Montreal, Que., Canada.....	Sept. 1, 1897
GUDMUNDSSON, GISLI. Asst. to Hermann Laub, 610 Lewis Bldg., Pittsburg, Pa.....	Jan. 3, 1900
GUERINGER, LOUIS AMEDEE. Asst. Engr., International & Gt. North. R. R., Palestine, Tex.....	May 7, 1902
HAAS, EDWARD FRANCIS. 320 Sansome St., San Francisco, Cal.....	Jun. Feb. 6, 1894
	Assoc. M. Sept. 5, 1900
HAGAR, EDWARD MCKIM. Mgr., Cement Dept., Illinois Steel Co., 1060 The Rookery, Chicago, Ill.....	Feb. 6, 1901
HAIN, JAMES C. Engr., Masonry Constr., C., M. & St. P. Ry. Co., 1100 Old Colony Bldg., Chicago, Ill.....	May 1, 1901
HAINES, EUGENE GROVE. Res. Engr., Div. No. 1, Atlantic Ave. Impvt., L. I. R. R., 5 Hanson Pl., Brooklyn, N. Y.....	May 1, 1901
HALL, CHARLES ROMNEY. U. S. Engr. Dept., Fort McKinley, Portland Harbor, Me.....	Jan. 7, 1903
HALL, LOUIS WELLS. Asst. Engr., U. S. Engr. Office, Tuscaloosa, Ala.....	Oct. 1, 1902
HALLIHAN, JOHN PHILIP. Res. Engr. and Supt., Cananea Consolidated Copper Co.'s Ry., La Cananea, Sonora, Mexico.....	April 4, 1900
HAM, WILLIAM HALE. Edgt. of N. Y. Expanded Metal Co., 256 Broadway, New York City.....	Nov. 5, 1902
HAMMATT, WILLIAM CUSHING. 2 State St., Bangor, Me.....	Sept. 5, 1900

# ASSOCIATE MEMBERS H

	Date of Membership.
HANNA, JOHN HUNTER. Asst. Chf. Engr. and Supt., Capital Traction Co., 36th and M Sts., Washington, D. C.	April 3, 1901
HARAHAN, WILLIAM JOHNSON. Asst. Gen. Mgr. Ill. Cent. R. R., Chicago, Ill.	Oct. 3, 1894
HARDISON, ALLEN CROSBY. Civ. and Min. Engr., 1017 West 24th St., Los Angeles, Cal.	Feb. 6, 1901
HARDY, HARRY. 54 Burlington Rd., Bayswater, London, W., England.	June 1, 1892
HARLOW, JAMES HAYWARD, Jr. Conowingo, Cecil Co., Md.	Mar. 5, 1902
HARMAN, JACOB ANTHONY. Civ. and San. Engr., 109 S. Jefferson Ave., Peoria, Ill.	May 4, 1898
HARPER, AUSTIN CURTIN. U. S. Asst. Engr., U. S. Engr. Office, Norfolk, Va.	Jan. 7, 1903
HARPER, ISAAC ONWARD. Secy. and Treas., Lauer & Harper Co., Westport, Md.	May 7, 1902
HARRINGTON, FERDINAND FINNEY. Bridge Dept., N. Y. C. & H. R. R. Co., Grand Central Station, New York City	May 3, 1899
HARRINGTON, JOHN LYLE. C. W. Hunt Co., West New Brighton, N. Y.	Jun. Aug. 31, 1897
HARRIS, VAN ALLEN. Care, Giles & Harris, Civ. Engrs., San Juan, Porto Rico	Oct. 4, 1899 Nov. 6, 1894 Oct. 5, 1898
HARTE, CHARLES RUFUS. With Stone & Webster, 93 Federal St., Boston, Mass.	Jun. April 4, 1899 May 2, 1900
HARTWELL, HARRY. Asst. Supt., Constr., J. G. White & Co., Ltd., 22a College Hill, London, E. C., England.	Jun. Jan. 2, 1894 Feb. 2, 1898
HARWOOD, GEORGE ALEC. Asst. Engr., N. Y. C. & H. R. R. R., West Shore Station, Syracuse, N. Y.	Feb. 5, 1902
HASSEKARL, JOSEPH FREDERICK. Supt. of Constr., U. S. Engr. Dept. (Res., 2504 North 5th St.), Philadelphia, Pa.	Mar. 5, 1902
HASTINGS, FRANK ARNOLD. Eng. Dept., Am. Bridge Co., 51st and Butler Sts. (Res., 21 Mawhinney St.), Pittsburg, Pa.	Dec. 3, 1902
HATT, WILLIAM KENDRICK. Prof. of Applied Mechanics, Purdue Univ., Lafayette, Ind.	June 4, 1902
HAUCK, WILLIAM. Asst. Engr., Rapid Transit Comm., 742 St. Nicholas Ave., New York City	June 5, 1901
HAWES, LOUIS EDWIN. Civ. and Hydr. Engr., 101 Tremont St., Boston, Mass.	Sept. 2, 1896
HAWLEY, GEORGE PRINCE. Fairmont, Martin Co., Minn.	Feb. 6, 1901
HAYCROFT, JAMES ISAAC. Fontenoy, Ocean St., Woollahra, New South Wales, Australia.	Jan. 3, 1894
HAYDEN, JOHN BRUCE. Bridge Dept., N. Y. C. & H. R. R. R., Room 500, Grand Central Station, New York City	May 2, 1900
HAYES, GEORGE SAMUEL. 111 Fifth Ave., New York City	Jun. Dec. 6, 1892 Assoc. M. June 3, 1896
HAYFORD, JOHN FILLMORE. Insp. of Geodetic Work and Chf. of Computing Div., Coast and Geodetic Survey, Washington, D. C.	May 6, 1896
HAZARD, ERSKINE. Care, Globe & Phoenix Gold Min. Co., Ltd., Sebakwe, Rhodesia, South Africa	Oct. 2, 1895



# ASSOCIATE MEMBERS H

	Date of Membership.
HAZEN, WILLIAM NELSON. (Frink & Hazen), 711 Union Trust Bldg., Baltimore, Md.....	Dec. 3, 1902
HAZLETT, ROBERT. City Bank Bldg., Wheeling, W. Va.....	Mar. 4, 1896
HEINDLE, WILLIAM ALBERT. Asst. Engr., J. G. White & Co., Ltd., 22a College Hill, Cannon St., London, E. C., England.....	Nov. 6, 1901
HELM, EDWIN GUY. Civ. and Cons. Engr., 209 Arcade, East St. Louis, Ill.....	Dec. 5, 1900
HEMMING, DUNKIN WIRGMAN. 502 West 143d St., New York City.....	Sept. 7, 1892
HENDERSON, JOHN THOMAS. Asst. Engr., Conn. River Bridge and Highway Dist., 650 Main St., Hartford, Conn.....	Sept. 3, 1902
HENDRICKS, VICTOR KING. Asst. to Engr., M. of W., B. & O. R. R. Co., 111 West Saratoga St., Baltimore, Md.....	May 1, 1895
HENRY, FRANCIS MAXWELL. Lumber Exchange, Minneapolis, Minn....	Mar. 4, 1896
HENRY, PHILIP WALTER. Vice-Pres., Medina Quarry Co., 80 Broadway, New York City.....	Jan. 3, 1894
HERRICK, JOHN JAMES. 161 Franklin Pl., Flushing, N. Y.....	June 6, 1900
HERRING, WILLARD E. Div. Engr., Tex. & Okla. R. R. Co., Shawnee, Okla.....	Sept. 4, 1901
HIGHLEY, LEE. B. and B. Dept., Mo. Pac. Ry., Pacific, } Mo. } Assoc. M.	Dec. 7, 1897 Dec. 4, 1901
HILL, CURTIS. Sewer Dept., City Hall, St. Louis, Mo.....	Oct. 2, 1901
HILL, EDWIN ALLSTON. Asst. Examiner, U. S. Patent Office, Washington, D. C.....	May 3, 1893
HILL, JOHN EDWARD. Prof. of Civ. Eng., Brown Univ., Providence, R. I.....	May 4, 1892
HILL, THEODORE WILLIAM. 613 The Nasby, Toledo, Ohio.....	Mar. 7, 1900
HILL, WALTER ARTHUR. Res. Engr., Mex. National R. R., Laredo, Tex.....	Sept. 2, 1896
HILLIARD, FOSTER HAVEN. Lock Box 217, Memphis, Tenn.....	Mar. 6, 1901
HIRST, ARTHUR. Asst. Engr., Eng. Dept., Am. Bridge Co., Pencoyd, Pa.....	Dec. 3, 1902
HITE-SMITH, VAN DUSEN. Civ. and San. Engr., Knoxville, Tenn....	April 3, 1901
HOBBY, ARTHUR STANLEY. Gen. Mgr., Guantanamo R. R., Guantanamo, Cuba.....	Sept. 4, 1901
HOFFMANN, ROBERT. Asst. Engr., Dept. of Public Works, Div. of Sewers and Drains, 55 Osborn St., Cleveland, Ohio.....	June 5, 1901
HOGUE, CHARLES JAY. Asst. Engr., M. of W., C., O. & G. R. R., Little Rock, Ark.....	Dec. 7, 1898
HOLBROOK, PERCY. Gen. Mgr., The Weber Ry. Joint Mfg. Co., 71 Broadway, New York City....	Mar. 2, 1898
HOLMES, GLENN DICKINSON. Asst. Engr., Bureau of Filtration, 2130 Green St., Philadelphia, Pa.....	June 5, 1901
HOMAN, WILLIAM MACLEAN. 13 Mutual Bldgs., Durban, Natal, South Africa.....	June 7, 1899
HONE, FREDERIC DE PEYSTER. (Chambers & Hone), 60 New } St., New York City } Assoc. M.	April 4, 1899 Feb. 5, 1902
HONENS, FREDERICK WILLIAM. U. S. Junior Engr., Illinois and Mississippi (Hennepin) Canal, Sterling, Ill.....	April 3, 1901

## ASSOCIATE MEMBERS H-J

		Date of Membership.	
HONNESS, GEORGE GILL.	Div. Engr., Jersey City Water Supply Co., Boonton, N. J.	{ Jun. Feb. 2, 1897 Assoc. M. Sept. 4, 1901	
HOPKINS, ALBERT LLOYD.	Asst. to Gen. Supt., Newport News Shipbuilding & Dry Dock Co., Newport News, Va.	{ Jun. April 3, 1894 Assoc. M. April 3, 1901	
HORTON, THEODORE.	Prin. Asst. with Hering & Fuller, 170 Broadway, New York City	{ Jun. Aug. 31, 1897 Assoc. M. April 4, 1900	
HOUSTON, GAVIN NELSON.	University Park, Denver, Colo.	{ Jun. May 4, 1897 Assoc. M. Nov. 7, 1900	
HOWARD, CHARLES POPE.	Quinnimont, W. Va.	Jan. 3, 1894	
HOYT, JOHN T NOYE.	Structural Engr., Green & Wicks, 110 Franklin St., Buffalo, N. Y.	{ Jun. Feb. 28, 1893 Assoc. M. Mar. 2, 1898	
HUBBARD, WINFRED DEAN.	Supt., Water-Works and Sewers, Concord, Mass.	Nov. 5, 1902	
N. HUBBELL, CLARENCE WILLIAM.	Civ. Engr. to Board of Water Commrs., 232 Jefferson Ave., Detroit, Mich.	{ Jun. May 31, 1898 Assoc. M. April 4, 1900	
HUESTIS, CHARLES CALVIN.	Gen. Mgr., The T. H. Riddle Constr. Co. of New Brunswick, N. J., Martinsburg, W. Va.	Mar. 6, 1901	
HUGHES, FRANCIS DEY.	Asst. Engr., Midland Bridge Co., Box 385, Kansas City, Mo. (Res., 322 East Short St., Independence, Mo.)	Sept. 3, 1902	
HUMPHREY, HENRY CYPRIAN.	Provincial Superv., Manila, Philippine Islands.	Sept. 4, 1901	
HUMPHREY, RICHARD LEWIS.	Cons. Engr.; Engr. and Gen. Mgr., Buckhorn Portland Cement Co., 1001 Harrison Bldg., Philadelphia, Pa.	May 5, 1897	
HUMPHREYS, CLIFTON STEWART.	Mill Archt. and Engr. (Snow & Humphreys), 85 Water St., Boston, Mass. (also Madison, Me.)	May 2, 1900	
HUNTER, ROBERT EASTON.	644 St. Denis St., Montreal, Que., Canada.	Nov. 6, 1901	
HUSTON, TILLINGHAST L'HOMMEDIEU.	Mgr. for Cuba, Jas. B. Clow & Sons, 36 Obispo, Havana, Cuba	May 2, 1900	
HUTCHINSON, CARY TALCOTT.	Cons. Elec. Engr., 56 Pine St., New York City	Mar. 4, 1896	
HYDE, CHARLES GILMAN.	Asst. Engr. in Chg. of Filters (Investigations, Design and Constr.), Board of Public Works, Harrisburg, Pa.	April 2, 1902	
HYDE, WILLIAM HERBERT.	Res. Engr., Constr. Dept., B. & O. R. R., Ravenna, Ohio	{ Jun. April 30, 1901 Assoc. M. June 4, 1902	
INGRAM, EDWARD LOVERING.	Expert Aid, Dept. of Yards and Docks, New York Navy Yard (Res., 170 Washington Park), Brooklyn, N. Y.	Sept. 4, 1895	
JACKSON, JAMES MADISON.	Chf. Engr., Parkersburg & Inter-Urban R. R. Co., Parkersburg, W. Va.	Jan. 2, 1901	
JACKSON, JOHN FRANKLIN.	Contr. Engr., Wisconsin Bridge & Iron Co., Houghton, Mich.	May 2, 1894	
JACOBS, JOSEPH.	Chf. Draftsman, M. of W. Dept., S. P. Co., San Francisco, Cal.	Sept. 4, 1901	

# ASSOCIATE MEMBERS J K

		Date of Membership.
JANNEY, THOMAS GORDON.	Gen. Mgr., Centerville Dredging Co., Centerville, Idaho.	Oct. 3, 1900
JANVIN, NED HERBERT.	Asst. Engr., Am. Bridge Co., Wissahickon, Philadelphia, Pa.	Oct. 5, 1897
JARRETT, EDWIN SETON.	Of the Foundation & Contr. Co., 35 Nassau St., New York City.	June 5, 1901
JAUDON, HENRY SCUDDER.	Care, Birmingham Water-Works Co., Birmingham, Ala.	May 1, 1895
JENCKES, LAWRENCE BATES.	1038 Murray Hill Ave., Pittsburg, Pa.	Feb. 4, 1903
JOHNSON, ALEXANDER.	Asst. Engr., Williamsburgh Bridge, Foot of Delancey St., New York City.	Mar. 31, 1891
JOHNSON, LEWIS JEROME.	Asst. Prof. of Civ. Eng., Harvard Univ., 309 Pierce Hall, Cambridge, Mass.	Oct. 7, 1896
JOHNSON, RANKIN.	Box 21, Ciudad Porfirio Diaz, Coahuila, Mexico.	Sept. 5, 1900
JOHNSON, WILLIAM EDWARD.	Chf. Engr. for Hartford Water Comm., P. O. Box 37, West Hartford, Conn.	Sept. 4, 1901
JOHNSON, WILLIAM STONE.	Asst. Engr., Mass. State Board of Health, Room 140, State House, Boston, Mass.	April 3, 1901
JONES, HENRY LLEWELLYN.	Contr. Engr. for Am. Bridge Co. of N. Y., 14 Marten Pl., Sydney, New South Wales, Australia.	June 6, 1894
JONSON, ERNST FREDRIK.	Care, Lewinson & Just, 128 West 42d St., New York City.	Oct. 5, 1898
JORDAN, WILLIAM FREDERICK.	Prin. Asst. Engr., N. Y. C. & H. R. R. R., Grand Central Station, New York City.	Jan. 3, 1900
C. KAHN, JULIUS.	Cons. Engr., Union Trust Bldg., Detroit, Mich.	April 1, 1891
KEAYS, REGINALD HORTON.	Engr., Farrell, Hopper & Co., 112 West 111th St., New York City.	May 3, 1898
KELLER, CHARLES LINCOLN.	First Asst. Engr., The Scherzer Rolling Lift Bridge Co., 1616 Monadnock Blk., Chicago, Ill.	Oct. 3, 1900
KELLOGG, ALBERT VICTOR.	Engr., M. of W., H. & T. C. R. R. Co.; H., E. & W. T. Ry. Co. and H. & S. Ry. Co., Houston, Tex.	June 6, 1899
KENNEY, EDWARD FULBISTER.	Engr. of Tests, P. R. R., Broad St. Station, Philadelphia, Pa.	April 3, 1901
KENTON, GEORGE CECIL.	Engr.'s Dept., Mersey Docks and Harbor Board (Private address, "Beau Coin," Almond's Green, West Derby), Liverpool, England.	Oct. 1, 1898
KETCHUM, MILO SMITH.	Asst. Prof. of Civ. Eng., Univ. of Illinois, Champaign, Ill.	Mar. 6, 1901
KINSEY, FRANK WILMARTH.	Parker House, Boston, Mass.	Nov. 6, 1895
KNAF, EDGAR DAY.	Asst. Engr., Dept. of Bridges, Foot of Delancey St., East River, New York City.	Nov. 3, 1896

# ASSOCIATE MEMBERS K-L

		Date of Membership.
KNIGHT, FRANK BARR.	Asst. Engr., Lidgerwood Mfg. Co., 96 Liberty St., New York City.....	Sept. 4, 1901
KNOCH, JULIUS JAMES.	Prof. of Civ. Eng., Univ. of Arkansas, Fayetteville, Ark.....	Oct. 2, 1901
KNOWLES, MORRIS.	Filtration Engr., City of Pittsburg: } Civ. and Cons. Engr. (Chapin & Knowles), 1017 Frick Bldg., Pittsburg, Pa.....	Jun. Oct. 4, 1892 Assoc. M. Jan. 1, 1896
KNOWLTON, THEODORE ELY.	Asst. Treas., St. Regis Paper Co., Watertown, N. Y.....	Assoc. Mar. 31, 1896 Assoc. M. May 7, 1902
KOENIG, ARNOLD CHARLES.	Civ. and Hydr. Engr., 514 Bee Bldg., Omaha, Nebr.....	Nov. 7, 1900
KOPS, JULIAN DE BRUYN.	Asst. City Engr., Savannah, Ga.....	April 4, 1894
KYLE, GEORGE ALLAN.	1310 North Sixth St., Tacoma, Wash.....	Feb. 2, 1892
LAMBERT, WALLACE CORLISS.	Asst. Engr. in Chg. of Estimating Dept., New England Structural Co., 110 State St., Boston, Mass.....	April 4, 1900
LANE, EDWIN GRANT.	Asst. Div. Engr., B. & O. R. R., Cumberland, Md.	Jan. 8, 1902
LANE, FREDERICK EUGENE.	Asst. Engr., Atlantic Ave. Impvt., L. I. R. R., 5 Hanson Pl. (Res., 1037 Bergen St.), Brooklyn, N. Y.....	Oct. 1, 1902
LATHBURY, BENJAMIN BRENTNALL.	Pres., Alma Portland Cement Co. (Lathbury & Spackman), 1619 Filbert St., Philadelphia, Pa.....	Mar. 3, 1897
LATTA, HARRISON WAINWRIGHT.	Pres., Latta & Terry Co., Engrs. and Contrs., 801 Drexel Bldg., Philadelphia, Pa.....	Sept. 5, 1900
LAVER, FRED.	Asst. Engr., N. Y. C. & H. R. R. R., Albany, N. Y.....	Sept. 6, 1899
LAWLOR, THOMAS FRANCIS.	220 Broadway, New York City: } Jun. June 5, 1889 Assoc. M. May 2, 1894	
LAWTON, PERRY.	7 Savings Bank Bldg., Quincy, Mass.: } Jun. Jan. 3, 1893 Assoc. M. Sept. 2, 1896	
LAWTON, WALTER LUMAN.	Structural Engr. for N. Y. State Archt., 132 Chestnut St., Albany, N. Y.....	Mar. 5, 1902
LEAVITT, CHARLES WELFORD, Jr.	15 Cortlandt St., New York City...	Jan. 4, 1898
LEE, DAVID READ.	Care, Water Commrs., Middletown, N. Y.....	Oct. 7, 1896
LEEPER, JOHN BIGGER.	Asst. Engr., Am. Bridge Co., 51st St., Pittsburg, Pa.....	Jan. 3, 1900
LEFFINGWELL, FRANK DODGE.	Deputy Commr. of Highways, Harrisburg, Pa.....	Oct. 5, 1898
LENTILHON, EUGENE.	Contr. Engr. and Bldg. Constr., 489 Fifth Ave., New York City.....	Jun. Mar. 1, 1891 Assoc. M. Mar. 6, 1895
LEPPER, FRED WILLIAM.	Structural Engr., U. S. Treasury Dept., Washington, D. C.....	Jan. 2, 1901
LEWERENZ, ALFRED COURTNEY.	Civ. Engr., U. S. N., U. S. Navy Yard, Bremerton (Puget Sound), Wash....	Jun. Mar. 5, 1895 Assoc. M. June 6, 1900
LEWIS, CLARENCE MCKENZIE.	Care, Wm. Salomon & Co., 25 Broad St., New York City.....	Dec. 3, 1902
LILLY, GEORGE WASHINGTON.	Asst. Engr., Dept. of Public Impvts., Columbus, Ohio.....	April 2, 1902
LION, LÉON ÉLIE.	Junior Engr., U. S. Engrs., 1010 Bur- gundy St., New Orleans, La.....	Jun. Feb. 1, 1898 Assoc. M. April 4, 1900

# ASSOCIATE MEMBERS L-M

		Date of Membership.
LIVERMORE, NORMAN BANKS. Civ. and Hydr. Engr., Room 903, Rialto Bldg., San Francisco, Cal.....	{ Jun. Dec. 5, 1899 Assoc. M. Oct. 1, 1902	
LLEWELLYN, FREDERICK THOMAS. Gen. Mgr., Monterey Foundry & Mach. Co., Monterey, Mexico.....		Oct. 4, 1899
LOCKE, WILLIAM WILLARD. San. Insp., Met. Water and Sewerage Board, 5 Myrtle St., South Framingham, Mass.....		Oct. 6, 1897
LOCKWOOD, WILLARD DATUS. Wharton, N. J.....	{ Jun. April 3, 1894 Assoc. M. Oct. 7, 1896	
LONG, EUGENE MCLEAN. 220 Broadway, New York City.....		June 1, 1898
LOOKER, HENRY BRIGHAM. Surv. of the Dist. of Columbia, Surveyor's Office, Washington, D. C.....		May 3, 1893
LOW, GEORGE EVARTS. 45 Broadway, New York City.....	{ Jun. Nov. 6, 1894 Assoc. M. Mar. 2, 1898	
LOWINSON, OSCAR. Cons. Archt. and Engr. 39 Cortlandt St., New York City .....	{ Jun. May 3, 1892 Assoc. M. Feb. 7, 1900	
LUDWIG, JULIUS ALFRED. Room 1410, 26 Cortlandt St., New York City .....	{ Jun. May 31, 1892 Assoc. M. Oct. 2, 1895	
LUND, GEORGE ALFRED. 1131 Central Ave., Bridgeport, Conn.....		Nov. 7, 1894
LYLE, WILLIAM THOMAS. Instr. in Civ. Eng., Univ. of Pennsylvania, Philadelphia, Pa.....		Nov. 6, 1901
LYNCH, TYLLMAN DANIS. Insp. of Materials, Westinghouse Elec. & Mfg. Co., East Pittsburg, Pa.....		Nov. 3, 1897
LYON, WALLACE CHITTENDON. Asst. Structural Engr., Care, Superv. Archt.'s Office, Washington, D. C.....		Feb. 6, 1901
MACCREA, DON ALEXANDER. Div. Engr., C., O. & G. R. R., Guthrie, Okla.....	{ Jun. May 2, 1899 Assoc. M. Oct. 1, 1902	
MACGREGOR, ROBERT ATHOLE. Asst. Engr., Bureau of Highways, Borough of the Bronx, 177th St. and Third Ave., New York City .....		Nov. 2, 1898
MACNAB, GEORGE TRAVILLA. Asst. Engr., Highways, Borough of Bronx, 106 West 130th St., New York City.....		Feb. 3, 1897
MACNEILL, PERRY ROBINSON. Cons. Engr., 155 William St., Orange, N. J.....	{ Jun. April 5, 1898 Assoc. M. June 5, 1901	
McCAFFERY, RICHARD STANISLAUS. Supt., Santa Fe Gold & Copper Min. Co., San Pedro, N. Mex....	{ Jun. May 1, 1897 Assoc. M. Sept. 4, 1901	
McCAUSTLAND, ELMER JAMES. Asst. Prof. of Civ. Eng., Cornell Univ., Ithaca, N. Y.....		Sept. 5, 1900
McCLURE, JOHN CLARENDON. Asst. Engr., S. P. Co. (M. of W. Dept.), Arcade Depot, Los Angeles, Cal. ....		Feb. 6, 1895
McCORMACK, EDGAR WALTER. Chf. Engr., Nipe Bay Syndicate, Mayari, Prov. Santiago, Cuba.....		Mar. 6, 1901
McCREA, JAMES ALEXANDER. Supt., Cincinnati Div., Penn. Lines W. of Pitts., Cincinnati, Ohio.....	{ Jun. Nov. 1, 1898 Assoc. M. Nov. 7, 1900	
McCULLOCH, RICHARD. Asst. Gen. Mgr., Chic. City Ry. Co., 2020 State St., Chicago, Ill .....		Mar. 2, 1898
McDARGH, HARRY JOHN. First Asst. City Civ. Engr., 421 Summers St., Dayton, Ohio.....		April 2, 1902



# ASSOCIATE MEMBERS M

		Date of Membership.	
McGEE, VAN NORMAN.	Asst. Engr., N. Y. C. & H. R. R. R., Care, Chf. Engr., Grand Central Station, New York City.....	June 6, 1900	
McGILVRAY, THOMAS FORRESTER.	Cons. Engr., 209 First National Bank Bldg., Duluth, Minn.....	Feb. 5, 1902	
McGUIRE, JAMES CLARK.	Engr. and Contr., 26 Cortlandt St., New York City.....	Jun. May 5, 1891	} Assoc. M. Jan. 5, 1898
McKAY, GEORGE ALBERT.	Civ. Engr., U. S. N., Narragansett Bay Coal Depot, Newport, R. I.....	Feb. 4, 1903	
McKENNEY, CHARLES ALBERT.	Supt. of Constr., Trumbull St. Pumping Station (Res., "The Iowa"), Wash- ington, D. C.....	Jun. Dec. 4, 1894 Assoc. M. Dec. 1, 1897	
McKENZIE, THOMAS.	P. O. Box 712, Westerly, R. I.....	Jun. May 2, 1893 Assoc. M. Nov. 6, 1895	
McKIBBEN, FRANK PAPE.	Instr. in Civ. Eng., Mass. Inst. Tech., Boston, Mass.....	Jun. Jan. 3, 1895 Assoc. M. Mar. 6, 1901	
McMEIKIN, CHARLES WILLIAM.	Vice-Pres. and Cons. Engr., Britannia Copper Syndicate, Ltd., Vancouver, B. C., Canada.....	Jun. April 2, 1890 Assoc. M. Mar. 7, 1894	
McREYNOLDS, ORVAL OMAR.	Civ. and Min. Engr. (Middleton & Mc- Reynolds), 709 Equitable Bldg., Denver, Colo.....	Dec. 5, 1900	
MAGOR, HENRY BASIL.	Cons. Engr., 29 Broadway, New York City.....	Jun. April 30, 1895 Assoc. M. Mar. 7, 1900	
MALUKOFF, ALEXIS JOSEPH.	With Rapid Transit Comm., 320 Broad- way (Res., 72 West 131st St.), New York City.....	Jan. 2, 1901	
MANNING, ROLLO GLENROY.	Engr., Toledo Plant, Am. Bridge Co., 1303 Utah St., Toledo, Ohio.....	Oct. 2, 1901	
MARDEN, WALTER REUBEN.	Chf. Engr., The United Constr. Co., 467 Broadway, Albany, N. Y.....	April 4, 1894	
MARQUAND, PHILIP.	Partner of Allen, Sand & Co., Bankers, 7 Pine St., New York City.....	Oct. 5, 1898	
MARSTON, ANSON.	Cons. Engr.; Prof. of Civ. Eng., Iowa State Coll., Ames, Iowa.....	Oct. 4, 1893	
MARSTON, FRANK LEONARD.	49 Hammond St., Bangor, Me.....	Oct. 2, 1901	
MARTIN, JAMES WILLIAM.	306 Michigan St., Pueblo, Colo.....	Nov. 1, 1899	
MARTIN, KINGSLEY LEVERICH.	Asst. Engr., Dept. of Bridges, New York City, 84 Broadway, Brooklyn, N. Y.....	Jun. Nov. 5, 1895 Assoc. M. May 3, 1899	
MASON, GEORGE COTNER.	Cons. Engr.; Asst. Prof. of Civ. Eng., New York Univ., University Heights, New York City.....	Jun. Mar. 6, 1894 Assoc. M. May 3, 1899	
MATHEWSON, ISAAC.	611 Paseo Nuevo, City of Mexico, D. F., Mexico..	Mar. 7, 1894	
MATTHES, FRANCOIS EMILE.	U. S. Geological Survey, Washington, D. C.....	April 3, 1901	
MATTHES, GERARD HENDRIK.	Asst. Hydrographer, U. S. Geological Survey, Washington, D. C.....	June 6, 1900	
MAYER, AUGUST.	810 Jordan St., Shreveport, La.....	June 1, 1892	
MEAD, CHARLES ADRIANCE.	Upper Montclair, N. J.....	April 5, 1899	
MEEM, JAMES COWAN.	Cons. Engr. for Borough Constr. Co., 65th St. and 4th Ave. (Res., 395 Ocean Ave.), Brooklyn, N. Y.....	April 1, 1896	

# ASSOCIATE MEMBERS M

		Date of Membership.	
MESA, ANTONIO ESTEBAN.	33 West 118th St., New York City.....	Jan.	1, 1896
METCALF, LEONARD.	Cons. Engr., 14 Beacon St., Boston, Mass.....	Jan.	5, 1898
MILES, JOHN WILEY.	Chf. Engr., Ferrocarril Vera Cruz (Mex.), Ltd., 12 Calle Benito Juarez, Vera Cruz, Mexico.....	Oct.	2, 1901
MILLARD, CHARLES STERLING.	Asst. Engr., I. C. R. R., } Care, Chf. Engr. of Constr., Chicago, Ill. .... {	Jun.	May 2, 1899
		Assoc. M.	June 5, 1901
MILLER, CLIFFORD NEVILLE.	Asst. in Chg. of Chf. Engr.'s } Office, Commrs. of Water-Works (Res., 21 San Rafael } Bldg.), Cincinnati, Ohio..... {	Jun.	June 4, 1891
		Assoc. M.	Feb. 5, 1896
MILLER, HEW.	Civ. Engr. and Archt., 28 West 26th St., New York City.....	Mar.	3, 1897
MILNER, RUDOLPH PHILIP.	141 East 40th St., New York } City..... {	Jun.	Jan. 2, 1890
		Assoc. M.	April 7, 1897
MILLER, SHREWSBURY BEAUREGARD.	261 Union St., Hackensack, N. J.	Jan.	4, 1893
MILLS, JOHN CHARLES.	Care, Messrs. King, Hamilton & Co., Calcutta, India.....	Nov.	6, 1895
MITCHELL, CHARLES HAMILTON.	Hydr. Engr., Niagara Falls, Ont., Canada.....	June	4, 1902
MITCHELL, HORACE HULBURD.	Engr. and Contr. (Mitchell & Neff), 18 Ninth Ave., Newark, N. J.....	Mar.	7, 1894
MOGENSEN, OLAF EINAR.	Chf. Engr.'s Office, Mo. Pac. Ry. Co., St. L., I. M. & S. Ry. Co., and Leased, Operated and Independent Lines, 405 Equitable Bldg., St. Louis, Mo.....	April	7, 1897
MOISEWITZ, LEON SOLOMON.	Asst. Engr., East River Bridges } Nos. 3 and 4, Dept. of Bridges, Park Row Bldg., } New York City..... {	Jun.	Dec. 3, 1895
		Assoc. M.	Sept. 5, 1900
MOLER, WILLIAM GRIFFITH.	Apartado 289, City of Mexico, Mexico...	Jan.	3, 1900
MONCURE, WILLIAM AUGUSTUS.	R. of W. Agt., P. R. R., } Broad St. Station, Philadelphia, Pa..... {	Jun.	June 21, 1894
		Assoc. M.	Oct. 7, 1896
R. MONTONY, LIBERTY GILBERT.	128 Twelfth St., Troy, } N. Y. .... {	Jun.	May 3, 1892
		Assoc. M.	Feb. 5, 1896
MOORE, CHARLES GILLINGHAM.	Cons. Engr., 729 Society for Savings, Cleveland, Ohio.....	Mar.	5, 1902
MOORE, WALTER SOTHERON.	Supt., Chic. & S. E. Ry., Anderson, Ind..	Mar.	7, 1900
MOREY, RICHARD.	Gen. Mgr., Morey Eng. & Constr. Co., 807 Carle- ton Bldg., St. Louis, Mo.....	Jan.	2, 1901
MORITZ, CHARLES HOLLAND.	The Pittsburg Reduction Co., Niagara Falls, N. Y.....	Oct.	2, 1901
MORRISON, EUGENE TAYLOR.	Supt., Levering & Garrigues Co., Dunel- len, N. J. ....	Jan.	2, 1901
MORRISON, HARRY JOHNSON.	Div. Engr., Met. Water and Sewerage Board, 25 Leighton Ave., Clinton, Mass.....	Jan.	4, 1899
MORROW, JAY JOHNSON.	Capt., Corps of Engrs., U. S. A., Zamboanga, Mindanao, Philippine Islands .....	June	5, 1901
MOSES, JOHN CRANCH.	Chf. Draftsman, The Boston Bridge } Works, Inc., East Cambridge, Mass..... {	Jun.	July 2, 1890
		Assoc. M.	May 4, 1898
MOSES, PERCIVAL ROBERT.	Cons. Engr., 35 Nassau St., New York City.....	Oct.	3, 1900

# ASSOCIATE MEMBERS M-O

	Date of Membership.
MOSS, ROBERT EDWARD. Civ. and Structural Engr., 271 Broadway, New York City. ....	May 2, 1900
MOTT, DANIEL LIVERMORE. Civ. Engr. and Contr. (Mott & Kemper), Utica, N. Y. ....	April 6, 1898
MOTT, WILLIAM ELTON. Asst. Prof. of Civ. Eng., Cornell Univ., Ithaca, N. Y. ....	Mar. 5, 1902
MUNROE, HERSEY. Topographer, U. S. Geological Survey, Washing- ton, D. C. ....	Mar. 5, 1902
MURPHY, EDWARD CHARLES. Asst. Engr., U. S. Geological Survey, 130 Hazen St., Ithaca, N. Y. ....	Sept. 5, 1900
MYERS, EDWARD WARREN. Res. Hydrographer, U. S. Geological Survey, Greensboro, N. C. ....	Oct. 2, 1901
MYERS, JOHN HAYS. Asst. Engr., Rapid Transit R. R. { Jun. Comm., 147 Columbus Ave., New York City. .... } Assoc. M.	Dec. 5, 1893 Oct. 5, 1898
NAGLE, JAMES C. Prof. of Civ. Eng., Agri. and Mech. Coll. of Texas, College Station, Tex. ....	April 5, 1899
NELSON, WILLIAM. With the Fairbanks Co., 42 Pearl St., Boston, Mass.	June 6, 1900
NEUMEYER, ROBERT ENGLER. City Engr. of Bethlehem { Jun. and South Bethlehem, Pa., 207 Broad St., Bethlehem, } Assoc. M.	May 31, 1892 Mar. 3, 1897
NEWBERRY, SPENCER BAIRD. Gen. Mgr., Sandusky Portland Cement Co., Sandusky, Ohio. ....	Jan. 6, 1897
NEWTON, RALPH EELLS. Cons. Engr., Newton Eng. Co. (Inc.), Milwaukee, Wis. ....	Jan. 8, 1902
NICHOLS, CHARLES HENRY. Cons. Engr. and Engr. of { Jun. Connecticut Shell Fish Comm., New Haven, } Assoc. M.	May 2, 1893 May 2, 1900
NICHOLS, HENRY FRANCIS. Mgr. and Supt. Engr., James Hill & Sons, 63 Grenfell St., Adelaide, South Australia. ....	Oct. 1, 1902
NOBLE, FREDERICK CHARLES. 501 West 120th St., New York City. ....	June 4, 1902
NOBLE, WALTER EDWIN. Asst. Engr., Reservoir Comm., City Hall, Fall River, Mass. ....	April 2, 1902
NOSKA, GEORGE ALBERT. 33 East 17th St., New York City. { Jun. Assoc. M.	Mar. 31, 1896 Sept. 3, 1902
NOYES, HARRY LINCOLN. Mech. Engr., Union Carbide Co., Niagara Falls, N. Y. ....	June 5, 1901
O'BRIEN, JOSEPH HENRY. Asst. Engr., Westinghouse, Church, Kerr & Co., 8 Bridge St., New York City. ....	May 1, 1901
OESTREICH, HENRY LEWIS, JR. Asst. Engr., Rapid Transit { Jun. Comm., 13 Astor Pl. (Res., 2092 Bathgate Ave.), } Assoc. M.	Oct. 4, 1892 Dec. 6, 1899
OGDEN, HENRY NEELY. Asst. Prof. of Civ. Eng., Cornell { Jun. Univ. (Res., 614 University Ave.), Ithaca, N. Y. .... } Assoc. M.	Oct. 3, 1893 Oct. 5, 1898
OLBERG, CHARLES REAL. Care, U. S. Geological Survey, Washington, D. C. ....	May 7, 1902
OLDS, CLARK. Erie, Pa. ....	Mar. 1, 1899

# ASSOCIATE MEMBERS O-P

		Date of Membership.
OLNEY, ROBERT BLUM. Am. Pipe Mfg. Co., 112 North	{ Jun.	Jan. 3, 1895
Broad St., Philadelphia, Pa.....	{ Assoc. M.	Sept. 5, 1900
ORR, ALEXANDER. Supt., Gloversville Water-Works, Glov-	{ Jun.	June 4, 1901
ersville, N. Y.....	{ Assoc. M.	Feb. 5, 1902
OSBORN, OLLIE STEELE. Address unknown .....		Oct. 2, 1901
OSBOURN, HENRY VAN BUREN. 352 Chestnut Ave., Redlands, Cal....		Sept. 3, 1902
OSTRANDER, JOHN EDWIN. Prof. of Math. and Civ. Eng., { Jun.		May 2, 1888
Mass. Agri. Coll., Amherst, Mass.....	{ Assoc. M.	Sept. 2, 1891
PAQUETTE, CHARLES ALFRED. Supt., Chicago & White Water Divs., C.,		
C., C. & St. L. Ry., Indianapolis, Ind.....		April 6, 1898
PARSONS, ARCHIBALD LIVINGSTONE. Asst. Engr., U. S. Engr. Office for		
New Bldg. for Government Printing Office, P. O. Box 455, Wash-		
ington, D. C.....		May 7, 1902
PECK, JOHN GATES. Bridge Designer in office of State Engr. and Surv.,		
State Hall, Albany, N. Y.....		Sept. 3, 1902
PEMOFF, JOEL JUK. Asst. Engr., Dept. of Docks and Ferries, Pier A,		
North River, New York City.....		Nov. 5, 1902
PERKINS, PHILO SACKETT. Asst. Engr., N. Y., N. H. & H. { Jun.		Mar. 5, 1890
R. R., 59 Chester Ave., Providence, R. I.....	{ Assoc. M.	April 3, 1895
PETTEE, EUGENE EVERETT. 269 Lowell Ave., Newtonville, Mass.....		Sept. 3, 1902
PFEIFER, HERMAN JULIUS. (Pfeifer & Knox), 310 Fullerton Bldg., St.		
Louis, Mo.....		Sept. 6, 1899
PHARR, HARRY NELSON. Chf. Engr., St. Francis Levee Board, 168		
Randolph Bldg., Memphis, Tenn.....		Oct. 3, 1900
PHILLIPS, FREDERICK CLINTON. Div. Engr., Utica & Mo-		
hawk Val. Ry. Co., 584 Garden St., Little Falls, { Jun.		June 4, 1895
N. Y.....	{ Assoc. M.	April 4, 1900
PHILLIPS, HOWARD CRATHORNE. Asst. Supt., Chicago Div., { Jun.		April 5, 1892
A., T. & S. F. Ry., Fort Madison, Iowa.....	{ Assoc. M.	Sept. 6, 1899
PITTS, THOMAS DORSEY. Chf. Draftsman, Tams, Lemoine { Jun.		Dec. 7, 1897
& Crane, 52 Pine St., New York City.....	{ Assoc. M.	June 4, 1902
POLAND, WILLIAM BABCOCK. Supt., Indiana Div., B. & O. { Jun.		Oct. 31, 1893
S. W. R. R., Cincinnati, Ohio.....	{ Assoc. M.	May 3, 1899
POLLOCK, CLARENCE DuBOIS. Bureau of Highways, Dept. of Public		
Works, Municipal Bldg., Brooklyn, N. Y.....		Jan. 8, 1902
POPE, MACY STANTON. Insp. for Factory Mutual Fire Insurance Cos.,		
31 Milk St., Boston, Mass.....		May 2, 1900
PORTER, JAMES MADISON. Cons. Engr., 53 North 3d St., Easton, Pa..		May 4, 1892
POST, WILLIAM SCHUYLER. Engr., Arizona Power Co., 749 Garland		
Ave., Los Angeles, Cal.....		May 1, 1901
POTTER, ALEXANDER. Cons. Engr., 150 Nassau St., New { Jun.		Jan. 4, 1888
York City.....	{ Assoc. M.	Jan. 6, 1892
PRESSEY, HENRY ALBERT. Hydrographer, U. S. Geological Survey,		
Washington, D. C.....		May 1, 1901
PRESTON, HENRY WRAY. Engr., Elmira Plant, Empire Bridge Co.,		
Elmira, N. Y.....		May 3, 1899

## ASSOCIATE MEMBERS P-R

		Date of Membership.	
PRINCE, ARTHUR DICKSON. Asst. Engr., Rapid Transit Comm., 13 Astor Pl., New York City.....	{ Jun. May 5, 1896 Assoc. M. Oct. 3, 1900		
PRITCHARD, PHILIP MORRIS. Chf. Engr., United Alkali Co., Ltd., Widnes, Lancashire, England.....		June 6, 1900	
PRUYN, FRANCIS LANSING. Treas., United Eng. & Contr. Co., 13 Park Row, New York City.....	{ Jun. Dec. 1, 1896 Assoc. M. June 7, 1899		
PUTNAM, GEORGE ROCKWELL. Asst., U. S. Coast and Geodetic Survey, Washington, D. C.....		Feb. 1, 1899	
QUICK, ALFRED MERRITT. Pres. of the Water Board and Water Engr., City Hall, Baltimore, Md.....		Oct. 5, 1898	
RACE, JOHN MARBLE. Housatonic, Mass.....		Mar. 5, 1902	
RAMSEY, EDMUND PAYTON. Asst. Engr., 1st Div., Rapid Transit R. R. Comm., 13 Astor Pl., New York City (Res., 11 Flushing Ave., Brooklyn, N. Y.).....	{ Jun. Feb. 6, 1900 Assoc. M. Oct. 1, 1902		
REICHMANN, ALBERT FERDINAND. Asst. Engr., Western Div., Am. Bridge Co., 1318 Monadnock Blk., Chicago, Ill. ....	{ Jun. April 30, 1895 Assoc. M. Oct. 5, 1898		
REID, HOMER AUSTIN. Asst. Engr., Rapid Transit R. R. Comm., New York City (Res., 177 Columbia Heights, Brooklyn, N. Y.).....		Dec. 4, 1901	
REYNOLDS, JUSTIN OAKLEY. Asst. Engr., Rapid Transit R. R. Comm., 2041 Washington Ave., New York City..	{ Jun. Oct. 6, 1896 Assoc. M. Dec. 5, 1900		
RHODES, FRED DANA. Prin. Asst. Engr., J. B. & J. M. Cornell, 26th St. and 11th Ave., New York City....	{ Jun. June 6, 1899 Assoc. M. Nov. 6, 1901		
RHYS-ROBERTS, EDMUND ALYTH. Dominion Bridge Co., Ltd., Lachine Locks, Que., Canada.....		Nov. 3, 1897	
RICKEY, JAMES WALTER. Engr., St. Anthony Falls Water Power Co., 508 South First St., Minneapolis, Minn.....		Sept. 3, 1902	
RIEGLER, LOUIS JOHN. Engr., Penn. Co., 417 Third St., Allegheny, Pa.....		Sept. 3, 1902	
RIGHTS, LEWIS DANIEL. Engr., Eastern Div. Drawing Room, Am. Bridge Co., Pencoyd, Pa.....		Mar. 5, 1902	
RIPLEY, THERON MONROE. Res. Engr., Ohio River Bridge & Ferry Co., Marietta, Ohio.....		Nov. 6, 1901	
RITTENHOUSE, HARVEY. Delta, Colo.....	{ Jun. April 4, 1893 Assoc. M. Dec. 7, 1898		
ROBBINS, ALLAN APPLETON. (Rapid Transit Subway Con. Co.), 1913 Amsterdam Ave., New York City.....		Oct. 2, 1901	
ROBERTS, GEORGE THOMAS. Contr. Engr., 458 Ellicott Sq. (Res., 941 Elk St.), Buffalo, N. Y.....		Sept. 3, 1902	
ROBERTS, WILLIAM JACKSON. Assoc. Prof. of Math. and Civ. Eng., Washington Agri. Coll. and School of Science, Pullman, Wash.		June 6, 1900	
ROBERTSON, MARSHALL POPE. Mem., State Board of Engrs. of La., 225 Carondelet St., New Orleans, La.....		Mar. 5, 1902	
ROBINSON, HOLTON DUNCAN. Chf. Draftsman, New East River Bridge, 84 Broadway, Brooklyn, N. Y. (Res., 357 West 121st St., New York City).....	{ Jun. Mar. 1, 1893 Assoc. M. Jan. 3, 1894		



# ASSOCIATE MEMBERS R-S

	Date of Membership.	
ROCKENBACH, SAMUEL DICKERSON. Capt., 12th U. S. Cavalry, Chattanooga, Tenn.....	Feb.	6, 1901
ROCKWELL, JAMES VINCENT. Asst. Engr., C. & N. W. Ry., Eagle Grove, Iowa.....	Jun. { Assoc. M.	April 3, 1900 Feb. 4, 1903
ROMMEL, GEORGE, JR. 233 Broome St., Wilmington, Del. {	Jun. { Assoc. M.	Jan. 3, 1899 Mar. 5, 1902
ROSENBERG, FRIEDRICH. 1 Newark St., Hoboken, N. J. {	Jun. { Assoc. M.	Oct. 2, 1889 Jan. 6, 1892
ROSENTHAL, ALBERT. Supt., Mt. Vernon Dist., Westchester Lighting Co., 123 South 8th Ave., Mt. Vernon, N. Y. {	Jun. { Assoc. M.	Jan. 2, 1894 Nov. 6, 1901
ROSEWATER, WILLIAM MARCUS. Chf. Draftsman, The Bucyrus Co., South Milwaukee, Wis.....		June 5, 1901
ROSS, ELMER WAYLAND. Asst. Engr., Bridge Dept., City Engr.'s Office, Providence, R. I. {	Jun. { Assoc. M.	Mar. 5, 1890 June 1, 1892
ROUSSEAU, HARRY HARWOOD. Civ. Engr., U. S. N., U. S. Navy Yard, Mare Island, Cal. {	Jun. { Assoc. M.	June 6, 1893 April 4, 1900
ROWELL, GEORGE FREEMAN. Asst. Engr., Pennsylvania Water Co., 701 Wood St., Wilkesburg, Pa. {	Jun. { Assoc. M.	May 4, 1897 Jan. 2, 1901
ROY, ROBERT MAITLAND. Asst. to Vice-Pres. and Mgr., The Hamilton Bridge Works Co., Ltd., Hamilton, Ont., Canada.....		Oct. 3, 1900
RUGGLES, CHARLES ARNER. Eastern Mgr., Columbian Fireproofing Co., 1 Madison Ave., New York City.....		June 4, 1902
RUSSELL, RICHARD LORD. Asst. Engr., Atlantic Ave. Impvt., 5 Hanson Pl., Brooklyn, N. Y. {	Jun. { Assoc. M.	Feb. 5, 1895 April 3, 1901
RUST, HENRY BEDINGER. Supt., Constr., Colorado Fuel & Iron Co., 55 Block M, Pueblo, Colo.....		April 6, 1898
SABIN, ALVAH HORTON. Box 85, Long Island City, N. Y.....		Mar. 4, 1896
SABINE, EDWARD DANA. Chf. Engr., Am. Pneumatic Service Co., 115 Chauncey St., Boston, Mass.....		Feb. 5, 1902
SANDERS, FRANCIS NICOLL. 235 State St., Albany, N. Y.....		Sept. 3, 1902
SANFORD, HARRY CHARLES. Engr., The Degnon-McLean Contr. Co., 42d St. and 6th Ave., New York City.....		Oct. 5, 1898
SARGENT, JOSEPH ANDREWS. Asst. Engr., Reclamation Service, U. S. Geological Survey; Address, care, W. H. Horne, University Place, Nebr. ....		Oct. 2, 1901
SCAMMELL, JOHN KIMBALL. Asst. Engr., Public Works, Canada, Box 321, Saint John, N. B., Canada.....		June 4, 1902
SCARBOROUGH, FRANCIS WINTHROP. Engr., M. of W., C. & O. Ry., 302 West Franklin St., Richmond, Va. {	Jun. { Assoc. M.	Sept. 3, 1890 Mar. 6, 1895
SCHARSCHMIDT, SAMUEL HOWARD. Prin. Asst. Engr., Northern Ry., Co., Limon, Costa Rica.....		May 1, 1901
SCHENK, CARL LOUIS EDUARD. Contr. Engr., Exeter Machine Works, 1230 Park Bldg., Pittsburg, Pa.....		Oct. 1, 1902
SCHMITT, EWALD. 311 Florida Ave., N. W., Washington, D. C. ....		Feb. 7, 1900
SCHMITZ, FRANK CURTISS. Gen. Mgr., The Fireproofing Mfg. Co., 66 Beaver St., New York City.....		Dec. 6, 1899
SCHNEIDER, ANTON. 965 East 166th St., New York City.....		May 4, 1898

## ASSOCIATE MEMBERS S

	Date of Membership.	
SCHNEIDER, HERMAN. Instr. in Civ. Eng., Lehigh Univ., South Bethlehem, Pa.....	April 2, 1902	
SCHWIERS, FREDERICK WILLIAM. 704 West End Ave., New York City.....	Jun. 5, 1900	
	Assoc. M. Jan. 7, 1903	
SCOFIELD, EDSON MASON. Pres., The G. M. Scofield Co., Pittsburg, Pa.	April 1, 1896	
SCRIPTURE, ARTHUR MARQUIS. New Hartford, N. Y.....	June 3, 1896	
SEARS, ROBERT HUMPHREY. Res. Engr., East Indian Ry., Calcutta, India.....	Dec. 4, 1901	
SEATON, WILLIAM, JR. Care, C. W. Hunt Co., 45 Broadway, New York City.....	June 4, 1902	
SELTZER, HARRY KENT. Res. Engr., Provincial Govts. Fraser River Bridge (Waddell & Hedrick, Cons. Engrs.), Lock Box 535, New Westminster, B. C., Canada.....	Jun. 4, 1896	
	Assoc. M. Jan. 2, 1901	
SEUROT, PAUL ALBERT. Office Engr. (North River Section), Penn., N. Y. & L. I. R. R., 20 West 34th St., New York City.....	Jun. April 30, 1895	
	Assoc. M. Oct. 4, 1899	
SHANNAHAN, JOHN NEWTON. Pres., Mohawk Val. Constr. Co., Gloversville, N. Y.....	Jun. Oct. 4, 1898	
	Assoc. M. Mar. 6, 1901	
SHAW, ENOS LARKIN. 2667 N. Ashland Ave., Chicago, Ill.....	Jun. Oct. 3, 1893	
	Assoc. M. June 1, 1898	
SHELLENBERGER, LEIDY RUDY. Asst. Engr., Am. Bridge Co., Pencoyd Plant; Address, 204 Rochelle Ave., Wissahickon, Philadelphia, Pa.....	May 2, 1900	
SHEPARDSON, JOHN EATON. Shabbona Grove, DeKalb Co., Ill.....	Jan. 7, 1903	
SHOEMAKER, LOUIS HENRY. Engr., Estimating Office, Am. Bridge Co., 51st and Butler Sts., Pittsburg, Pa.....	Oct. 4, 1899	
SHORT, WILLIAM AMBROSE DUDLEY. Signal Engr., Cincinnati Div., C., N. O. & T. P. Ry. (Res., 200 Market St.), Lexington, Ky.....	Feb. 5, 1902	
SIMPSON, GEORGE. Asst. Chf. Engr., Thompson-Starrett Co., 51 Wall St., New York City.....	April 4, 1900	
SIRRIE, JOSEPH EMORY. Box 98, Greenville, S. C.....	Jun. June 20, 1893	
	Assoc. M. May 4, 1898	
SLAYTON, CHARLES ALBERT. Locating Engr., Choc., Okla. & Gulf R. R., Care, Chf. Engr., Little Rock, Ark.....	April 2, 1902	
SMITH, ALBERT. Saltsburg, Pa.....	Jan. 6, 1892	
SMITH, ALBERT HENRY. Mech. Engr. and Chf. Insp., Toledo Branch, Am. Bridge Co., 1309 Utah St., Toledo, Ohio.....	Oct. 2, 1901	
SMITH, CHARLES WILLIAM. Asst. Engr., O'Rourke Eng. Constr. Co., 2139 Park Row Bldg., New York City.....	April 5, 1893	
SMITH, LEONARD SEWALL. Asst. Prof., Topographic and Geodetic Eng., Univ. of Wisconsin, 939 University Ave., Madison, Wis..	June 2, 1897	
SMITH, PEMBERTON. Cons. Engr., New York Car Wheel Works, Buffalo, N. Y.....	Jun. Mar. 31, 1891	
	Assoc. M. April 4, 1894	
SMITH, WALTER MICKLE. U. S. Engr. Office, Portland, Me.....	Oct. 2, 1901	
SMITH, WILLIAM STUART. Dist. Mgr., Warren Bros. Co., Boston, Mass. and Warren Chemical & Mfg. Co., New York City, 149 Main St., West, Rochester, N. Y.....	Jan. 8, 1902	

# ASSOCIATE MEMBERS S

		Date of Membership.	
SMITH, WILSON FIRCH.	Asst. Engr., Rapid Transit R. R. ( Jun. Jan. 3, 1895		
Comm. (Res., 36 West 36th St.), New York City. . . . .	{ Assoc. M. May 1, 1901		
SNOW, FRANK HERBERT.	(Snow & Barbour, Civ. and San. Engrs.),		
Tremont Bldg., Boston, Mass. . . . .	June 4, 1895		
SOPER, GEORGE ALBERT.	San. Engr., 29 Broadway, New York City. . . . .	Feb. 6, 1901	
SPENCER, JOHN CLARK.	Designing Engr., Care, The Brown Hoisting Machinery Co., Cleveland, Ohio. . . . .	May 6, 1896	
SPENCER, THEODORE NELSON.	First Asst. Engr. in Chg., Torresdale Conduit, Impvt., Extension and Filtration of the Water Supply of Philadelphia, Philadelphia, Pa. . . . .	Sept. 5, 1900	
SPENCER, WALTER TUTTLE.	Div. Engr., N. Y. N. H. & H. ( Jun. May 2, 1893		
R. R., New Haven, Conn. . . . .	{ Assoc. M. Oct. 4, 1899		
SPIELMAN, JOHN GODFREY.	Fairfield, Iowa. . . . .	{ Jun. Mar. 4, 1891	
	{ Assoc. M. May 1, 1895		
SPOFFORD, CHARLES MILTON.	Instr. in Civ. Eng., Mass. Inst. Tech., Boston, Mass. . . . .	June 4, 1902	
STEARNS, EDWARD BURNHAM.	Contr. Mgr., Am. Bridge Co., 89 State St., Boston, Mass. . . . .	June 1, 1898	
STEECE, EMMET ABNER.	City Engr., City Hall, Burlington, Iowa. . . . .	Dec. 4, 1901	
STEFFENS, WILLIAM FREDERICK.	Room 500, Grand Central ( Jun. April 3, 1900		
Station, New York City. . . . .	{ Assoc. M. Oct. 1, 1902		
STENGER, ERNEST.	Asst. Supt., U. P. R. R. Co., 109 West Ellsworth St., Denver, Colo. . . . .	June 5, 1895	
STEVENS, ALEXANDER.	Supt. of Bldgs., New York Fire Dept., 157 East 67th St., New York City. . . . .	April 1, 1896	
STEVENS, PERLEY EGBERT.	The Willard, St. Paul, Minn. . . . .	{ Jun. April 6, 1897	
	{ Assoc. M. April 2, 1902		
STEWART, SPENCER JAMES.	Eagle Hotel, New Berlin, N. Y. . . . .	June 7, 1899	
STEWART, CLINTON BROWN.	Anchor, Ill. . . . .	Oct. 5, 1898	
STICKNEY, GEORGE FETTER.	Thebes, Ill. . . . .	{ Jun. May 1, 1894	
	{ Assoc. M. April 5, 1899		
STIDHAM, HARRISON.	Am. Bridge Co., 7 West 22d St., New York City. . . . .	April 4, 1900	
STOCKETT, ALFRED WALTON.	Ookiep, Namaqualand, Cape Colony, South Africa. . . . .	Jan. 1, 1896	
STORROW, SAMUEL.	Civ. and Min. Engr., 403 Douglas ( Jun. Sept. 10, 1891		
Bldg., Los Angeles, Cal. . . . .	{ Assoc. M. Oct. 2, 1895		
STOWE, HAROLD CLAIR.	(Clarke, Wright & Stowe, Contr. Engrs.), 232 Kent St., Brooklyn, N. Y. . . . .	April 7, 1897	
STRAHAN, CHARLES MORTON.	Prof., Civ. Eng., Univ. of Georgia, Athens, Ga. . . . .	June 1, 1898	
STRATTON, GEORGE DRAPER.	Asst. Engr., Western Div., S. P. R. R., 1039 Union St., Oakland, Cal. . . . .	Oct. 4, 1899	
STRATTON, GEORGE EBER.	U. S. Junior Engr., Room 1014, Barristers Hall, Boston, Mass. . . . .	Jan. 8, 1902	
STREHLOW, OSCAR EMIL.	U. S. Junior Engr., Tuscaloosa, Ala. . . . .	Mar. 6, 1901	
STRICKLER, GRATZ BROWN.	Supt. of Constr., U. S. Public ( Jun. Jan. 5, 1897		
Bldgs. in Chg. of Constr. of Govt. Bldgs., La. Purchase Exposition, St. Louis, Mo. . . . .	{ Assoc. M. Jan. 4, 1899		

## ASSOCIATE MEMBERS S-T

Date of Membership.

STRONG, WILLIAM EDWARD SCHENCK. Vice-Chairman of Operating Board, Am. Radiator Co., Chicago, Ill.....		April 6, 1898
STUART, JAMES LYALL. Care, James Stewart & Co., 1405 Park Bldg., Pittsburg, Pa.....	{ Jun. Assoc. M.	Oct. 4, 1898 Feb. 7, 1900
SWAAB, SOLOMON MARK. Asst. Engr., Phil. Rap. Trans. Co., Elev. R. R. and Subway Div., Philadelphia, Pa.....	{ Jun. Assoc. M.	May 3, 1898 Nov. 1, 1899
SWEITZER, NELSON BOWMAN. U. S. Examiner of Surveys, Surveying Div., Gen. Land Office, Washington, D. C.....	{ Jun. Assoc. M.	Feb. 28, 1893 Mar. 1, 1899
SYKES, GEORGE WHITFIELD. Civ. and Cons. Engr., Beaumont, Tex.....	{ Jun. Assoc. M.	April 30, 1895 Dec. 1, 1897
TABER, GEORGE AYMAR. Asst. Engr., Rapid Transit R. R. Comm., 231 West 125th St., New York City.....	{ Jun. Assoc. M.	April 30, 1895 June 7, 1899
TAINTER, FRANK STONE. Far Hills, N. J. ....		Jan. 3, 1900
TAIT, HAROLD. Asst. Engr., Bureau of Sewers, Borough of Queens, Hackett Bldg., Long Island City, N. Y.....		May 7, 1902
TAIT, JOHN GEORGE. Engr. and Contr., 31 West 125th St., New York City.....		May 6, 1896
TAYLOR, CHARLES FREDERICK. Treas., Boston Tunnel Constr. Co., 23 Lewis St., East Boston, Mass.....		Sept. 4, 1895
THEBAN, JOHN GERARD. Engr. in Chg. of Dept. of Bridges, Borough of the Bronx, Third Ave. and 177th St., New York City.....		Mar. 3, 1897
THOMAS, SAMUEL RICHARDS. Engr. and M. M., Ironton R. R., Chairman, Lehigh Fire Brick Co., Ltd., Hoken- dauqua, Pa.....	{ Jun. Assoc. M.	Oct. 4, 1892 Mar. 1, 1899
THOMES, EDWIN HOWARD. Asst. Engr., Rapid Transit Comm., 1st Div., 13 Astor Pl., New York City (Res., 4 Park Ave., Jamaica, N. Y.).....		Dec. 6, 1899
THOMPSON, ARTHUR WEBSTER. Div. Engr., M. of W., Pittsburg Div., B. & O. R. R., Pittsburg, Pa.....		June 4, 1902
THOMPSON, CLARK WALLACE. Vice-Pres., Wind River Lumber Co., Cascade Locks, Ore.....	{ Jun. Assoc. M.	Mar. 5, 1890 July 3, 1895
THOMPSON, ROBERT ANDREW. Chf. Engr., Railroad Comm. of Texas, Austin, Tex.....	{ Jun. Assoc. M.	April 6, 1897 Oct. 4, 1899
THOMPSON, SANFORD ELEAZER. Newton Highlands, Mass.....		April 1, 1896
THOMSON, ERNEST BURSLEM. U. S. Supt., St. Augustine, Fla.....		June 5, 1901
THORNLEY, JULIAN. Asst. Engr., N. Y. Rapid Transit R. R. Comm., 231 West 125th St., New York City.....		Jan. 2, 1901
THROOP, AUGUSTUS THOMPSON. Mgr., A. T. Throop & Co., Cons. and Contr. Engrs., Erie County Bank Bldg., Buffalo, N. Y.....	{ Jun. Assoc. M.	Oct. 3, 1893 Mar. 3, 1897
TIGHE, JAMES LAWRENCE. City Engr., Holyoke, Mass.....		Oct. 5, 1898
TILDEN, CHARLES JOSEPH. Asst. Engr., Rapid Transit R. R. Comm. of New York, 742 St. Nicholas Ave., New York City.....	{ Jun. Assoc. M.	May 31, 1898 Feb. 5, 1902
TODD, ALEXANDER MILLER. U. S. Supt., Lower Yazoo Levee Dist., Greenville, Miss.....	{ Jun. Assoc. M.	Oct. 1, 1895 Oct. 2, 1901



# ASSOCIATE MEMBERS T-V

		Date of Membership.
TOLTZ, MAX.	Mech. Engr., Great Northern Ry., St. Paul, Minn. ....	Sept. 7, 1892
TOMPKINS, EDWARD DE VOE.	Chf. Draftsman, Bureau of Yards and Docks, U. S. Navy Yard, League Island, Philadelphia, Pa. ....	{ Jun. Feb. 2, 1897 Assoc. M. Dec. 3, 1902
TONKIN THOMAS, JUAN.	Hydr. Engr., Care, Flint, Eddy & Am. Trading Co., 30 Broad St., New York City. ....	Mar. 7, 1900
TOWER, JAMES WALLACE.	Prin. Asst. Engr., Great Northern Paper Co., Millinocket, Me. ....	Oct. 2, 1901
TOWLE, CHARLES STEWART.	220 Broadway, New York City. ....	May 3, 1899
TOWSON, MORRIS SHERMAN.	16 Bolton Ave., Cleveland, Ohio. ....	Nov. 1, 1893
N. TRATMAN, EDWARD ERNEST RUSSELL.	1636 Monadnock Blk., Chicago, Ill. ....	{ Jun. April 7, 1886 Assoc. M. July 1, 1891
TRAVELL, WARREN BERTRAM.	With C. W. Hunt Co., West New Brighton, N. Y. ....	{ Jun. April 30, 1895 Assoc. M. Mar. 5, 1902
TRIPP, OSCAR HOLMES.	Room 30, Court House, Rockland, Me. ....	Oct. 7, 1896
TROUT, CHARLES ELIPHALET.	With Dept. of Docks and Ferries, Pier A, North River, New York City ....	{ Jun. Oct. 31, 1899 Assoc. M. Jan. 8, 1902
TSUJI, TARO.	Engr., Govt. Ry. Office, 24 Hongo Umicho Nichome, Tokyo, Japan. ....	{ Jun. Oct. 8, 1891 Assoc. M. Oct. 4, 1899
TUCKER, WILLIAM CONQUEST.	Civ. and San. Engr., 156 Fifth Ave., New York City. ....	{ Jun. May 5, 1891 Assoc. M. Dec. 5, 1894
TURNHAURE, FREDERICK EUGENE.	Prof. of Bridge and San. Eng., Univ. of Wisconsin, Madison, Wis. ....	{ Assoc. Aug. 31, 1897 Assoc. M. June 4, 1902
TURNER, DANIEL LAWRENCE.	103 West 48th St., New York City. ....	Feb. 2, 1898
TURNER, GEORGE DALLAS BAIRD.	Mgr., Red Bluff Gold Min. Co., Red Bluff, Mont. ....	Nov. 2, 1898
TYRRELL, WARREN AYRES.	Care, E. P. Maule, Jr., 1416 Chemical Bldg., St. Louis, Mo. ....	{ Jun. Oct. 2, 1900 Assoc. M. Oct. 1, 1902
ULRICH, DANIEL.	Div. Engr., Aqueduct Commrs., Jerome Park Res- ervoir, New York City. ....	Sept. 1, 1897
UPHAM, RICHARD DANA.	11 Broadway, New York City. ....	{ Assoc. Oct. 6, 1896 Assoc. M. April 3, 1901
URQUHART, GEORGE COPELAND.	Asst. Real Estate Agt., Penn. Lines W. of Pitts., 1004 Union Station, Pittsburg, Pa. ....	May 6, 1891
VAIL, CHARLES DAVIS.	Civ. and Hydr. Engr., Room 12, Bee Hive Bldg., Butte, Mont. ....	June 6, 1900
VAN ALSTYNE, HENRY ARTHUR.	Div. Engr., N. Y. State, State Hall, Albany, N. Y. ....	June 6, 1900
VAN BUSKIRK, CLARENCE RANDALL.	108 Van Sicken St., Brooklyn, N. Y. ....	Feb. 3, 1897
VAN CLEVÉ, AARON HOWELL.	Asst. Engr. in Chg. of draft- ing room and gen. constr., Niagara Falls Power Co., Niagara Falls, N. Y. ....	{ Jun. May 31, 1892 Assoc. M. Dec. 5, 1894
VAN ETIEN, LAWRENCE EDWARD.	New Rochelle, N. Y. ....	Dec. 6, 1899
VEDELER, GERDT HENRIK.	Afdelingsingeniør, Den Tekniske Revision, Departementet for de offentlige Arbeider, Victoria Terrasse 7, Christiania, Norway. ....	June 7, 1893



## ASSOCIATE MEMBERS V-W

	Date of Membership.	
VENABLE, WILLIAM MAYO. Local Mgr., The National Contr. Co., 713 Henden Bldg., New Orleans, La.....	Sept.	4, 1901
VICKERS, THOMAS McELDERRY. Mgr., Empire Mfg. Co., Auburn, N. Y. and Waldorf Mfg. Co., Seneca Falls, N. Y., 12 Westlake Ave., Auburn, N. Y.....	Mar.	2, 1898
VIEB, HENRY. Engr. of Resurveys, N. Y. C. & H. R. R. R. Co., Room 400, Grand Central Station, New York City.....	Feb.	7, 1900
VILLALON, JOSÉ RAMON. Prof. of Math., Univ. of Havana, { Jun. July 4, 1888 Mgr., The Cuba Dredging Co., Havana, Cuba..... { Assoc. M. Nov. 6, 1895		
VOGLESON, JOHN ALBERT. Second Asst. Engr., Bureau of Filtration, Torresdale Filters, Station M, Philadelphia, Pa.....	Jan.	2, 1901
VOORHEES, PAUL. Engr., The Buffalo & Susquehanna Iron Co. (Res., 195 Lockwood Ave.), Buffalo, N. Y.....	Feb.	3, 1892
VREDENBURGH, WATSON, JR. 32 Broadway, New York City.....	Mar.	6, 1901
VROOMAN, MORRELL. City Engr., Gloversville, N. Y.....	May	7, 1902
WADA, YOSHICHIKA. Doboku-kwantoku-cho. Niigata, Japan. { Jun. Sept. 7, 1887 Assoc. M. Oct. 2, 1895		
WADSWORTH, JOEL EDWARD. Asst. Div. Engr., Am. Bridge { Jun. Dec. 5, 1893 Co., 7 West 22d St., New York City..... { Assoc. M. May 5, 1897		
WAGNER, BERNARD MATTHEW. Asst. Engr., Dept. of Water Supply (257 East 12th St., Flatbush), Brooklyn, N. Y.....	May	3, 1899
WAGNER, JOSEPH CHRISTIAN. Surv. and Regulator, 9th Survey Dist., Dept. of Public Works, Philadelphia; Office, Chelton Ave. and Greene St., Germantown (Res., 1539 North 12th St.), Phila- delphia, Pa.....	June	7, 1899
WAITE, GUY BENNETT. Civ. Engr. and Contr., 624 East 19th St., New York City.....	May	2, 1894
WAITT, CHARLES GREENE. Waitt's Blk., Malden, Mass. { Jun. Aug. 31, 1897 Assoc. M. Oct. 5, 1898		
WALDRON, SAMUEL PAYSON. Engr., Berlin Plant, Am. Bridge Co., East Berlin, Conn.....	Jan.	7, 1903
WALKER, CLEMENT ISAAC. Chf. Engr., The Union Subway Constr. Co., 113 West 38th St., New York City.....	April	1, 1891
WALKER, JOSEPH JEANES. 7 West 22d St., New York City.....	Nov.	5, 1902
WALKER, JOSEPH MILTON. Chf. Engr., Mahoning Val. Ry. Co., Youngstown, Ohio.....	April	3, 1901
WALLACE, WILLIAM McGEHEE. In Chg., Scientific and { Jun. April 3, 1894 Computing Branch, Bureau of Constr. and Re- { Assoc. M. Nov. 6, 1901 pair, Navy Dept. (Res., 616 Eighteenth St., N. W.), Washington, D. C.....		
WALSH, GEORGE SCHENZER. Res. Engr., Salvador Ry. Co., { Jun. Feb. 2, 1897 Ltd., San Salvador, Salvador..... { Assoc. M. May 1, 1901		
WALTHER, EDWARD. (With Wallace, Jaastad, Drewsen), Sault Ste. Marie, Mich.....	May	1, 1895
WARMAN, FRED CONOVER. U. S. Asst. Engr., 2001 I St., N. W., Wash- ington, D. C.....	Jan.	3, 1900

## ASSOCIATE MEMBERS W

		Date of Membership.
WARRINGTON, HARRY ESMOND.	Asst. Engr., C., N. O. & T. P. Ry. Co., 205 Odd Fellows' Temple, Cincinnati, Ohio.	April 6, 1898
WASHINGTON, WILLIAM DE HERTBURNE.	1 Broadway, New York City.	Oct. 5, 1892
WASON, LEONARD CHASE.	Pres., Aberthaw Constr. Co., 8 Beacon St., Boston, Mass. (Res., 199 Harvard St., Brookline, Mass.)	April 3, 1901
WATSON, WALTER.	Salem, Va.	April 5, 1893
WATSON, WILBUR JAY.	Bridge Engr., The Osborn Eng. Co., Osborn Bldg., Cleveland, Ohio.	Oct. 4, 1898
WEBB, WALTER LORING.	Cons. Engr., 411 Walnut St., Philadelphia, Pa.	May 4, 1892
WEBSTER, ALBERT LOWRY.	Cons. Civ. and San. Engr., 82 Wall St., New York City.	Sept. 6, 1882
WESTON, ROBERT SPURR.	San. Engr., Chemical and Bacteriological Analyses, 14 Beacon St., Boston, Mass.	June 3, 1891
WEYMOUTH, FRANK ELWIN.	Asst. Engr., U. S. Geological Survey, Washington, D. C.	Feb. 5, 1902
WHEATLEY, ARTHUR CORNWALLIS.	Address unknown.	Sept. 4, 1901
WHEELER, HARRY ROBERTS.	1 Broadway, New York City.	May 7, 1890
WHEELER, RALPH NORMAN.	With Rapid Transit R. R. Comm., 13 Astor Pl., New York City.	Mar. 6, 1895
WHELOCK, DE FOREST AUGUSTUS.	City Engr., Warren County Surv., Warren Co., Warren, Pa.	April 4, 1888
WHIPPLE, GEORGE CHANDLER.	Director of Mt. Prospect Laboratory, Dept. of Water Supply, Gas and Electricity, New York City, Flatbush Ave. and Eastern Parkway, Brooklyn, N. Y.	May 4, 1892
WHISKEMAN, JAMES PETER.	Civ. Engr., Bureau of Bldgs., Borough of Manhattan, 220 Fourth Ave., New York City.	Jan. 31, 1899
WHISTLER, JOHN T.	U. S. Geological Survey (Res., 1823 Kalorama Ave.), Washington, D. C.	Nov. 7, 1900
WHITE, LAZARUS.	18 West 119th St., New York City.	Jan. 2, 1901
WHITE, WILLIAM MACINTIRE.	Asst., Eng. Dept., Am. Bridge Co., Pen- coyd, Pa.	May 1, 1900
WHITED, WILLIS.	Asst. Engr., Dept. Public Works, Pittsburg, Pa.	Feb. 4, 1903
WHITTEMORE, WALTER FRANK.	1 Newark St., Hoboken, N. J.	Mar. 6, 1889
WIGGIN, ERNEST WOODBURY.	Asst. Bridge Engr., N. Y.	April 6, 1892
WIGGIN, THOMAS HOLLI.	N. H. & H. R. R., New Haven, Conn.	May 5, 1896
WIGGINS, WILLIAM D.	Engr., M. of W., Toledo Div., Penn. Lines W. of Pitts., Toledo, Ohio.	May 7, 1902
WILCON, FRED ELMER.	956 Orange Grove Boulevard, Pasadena, Cal.	April 2, 1902
WILKERSON, THOMAS JEFFERSON.	Asst. to Div. Mgr. Am. Bridge Co., 51st and Butler Sts., Pittsburg, Pa.	Oct. 2, 1901
WILKES, JAMES KNAPP.	Chf. Engr. of Sewers, City Hall, New Ro- chelle, N. Y.	April 1, 1896
		April 3, 1894
		Jan. 5, 1898
		June 3, 1891

## ASSOCIATE MEMBERS W-Z

		Date of Membership.	
WILKINS, GEORGE SHREVE.	Prof. of Eng., Univ. of Ala- bama, University P. O., Ala. ....	{ Jun.      Oct. 4, 1892 Assoc. M.      Oct. 5, 1898	
WILLIAMS, CHARLES PAGE.	U. S. Engr. Office, New London, Conn. ....	Oct. 2, 1901	
WILLIAMS, CHAUNCEY GRANT.	117 Montague St., Brooklyn, N. Y. ....	Feb. 6, 1895	
WILLS, ARTHUR JOHN.	Salisbury, N. C. ....	May 7, 1902	
WILSON, CHARLES WILLIAM SCHRAGE.	Engr., Naughton Co., 258 Broadway, New York City (Res. New Ro- chelle, N. Y.) ....	{ Jun.      April 5, 1892 Assoc. M.      Jan. 3, 1900	
WILSON, HENRY FELIX, JR.	Civ. and Min. Engr., Room 416, Chalifoux Bldg., Birmingham, Ala. ....	April 2, 1902	
WILSON, PERCY HARTSHORNE.	Engr., River & Harbor Impvt. Co., 801 Drexel Bldg., Philadelphia, Pa. ....	{ Jun.      Jan. 2, 1900 Assoc. M.      Feb. 5, 1902	
WILSON, THOMAS WILLIAM.	Chf. Engr., International Ry. Co., Buffalo, N. Y. ....	April 4, 1900	
WINFREE, PEYTON BROWN.	Cons. Engr., 1300 Tenth St., Lynchburg, Va. ....	{ Jun.      Oct. 2, 1894 Assoc. M.      May 3, 1898	
WING, CHARLES BENJAMIN.	Prof. of Structural Eng., Stanford Uni- versity, Cal. ....	Nov. 4, 1896	
WING, FREDERICK KELLY.	110 White Bldg., Buffalo, N. Y. ....	{ Jun.      May 31, 1892 Assoc. M.      Nov. 1, 1899	
WINN, WALTER SCOTT.	U. S. Asst. Engr., Kingman, Ala. ....	Oct. 6, 1897	
WOLF, JULIUS HERMAN GEORGE.	U. S. Engr. Office, 92 Flood Bldg., San Francisco, Cal. ....	May 7, 1902	
WOLVERTON, IRVING MASON.	Chf. Engr., The Mt. Vernon Bridge Co., Mt. Vernon, Ohio. ....	Dec. 4, 1895	
WOOD, IRVING SPARROW.	Asst. Engr. in Chg. of Water Dept., City Engr.'s Office, Providence, R. I. ....	{ Jun.      Mar. 5, 1890 Assoc. M.      Mar. 7, 1900	
WOODARD, SILAS.	Asst. Engr., P., N. Y. & L. I. R. R., 20 West 34th St., Room 83, New York City. ....	Jan. 2, 1901	
C. WOODS, ROBERT PATTERSON.	Chf. Engr., Townsend, Reed & Co., Ry. Builders, 1208 Stevenson Bldg., Indi- anapolis, Ind. ....	{ Jun.      Feb. 2, 1897 Assoc. M.      Mar. 7, 1900	
WORTENDYKE, NICHOLAS DOREMUS.	Asst. Chf. Engr., Board of Street and Water Comms. (Res., 108 Bentley Ave.), Jersey City, N. J.	Feb. 1, 1899	
WRIGHT, JOSEPH BODINE.	(Clarke, Wright & Stowe, Engrs. and Contrs.), 232 Kent St., Brooklyn, N. Y. ....	June 2, 1897	
WRIGHT, MOSES HANNIBAL.	Roadmaster, L. & N. R. R., Nashville, Tenn. ....	{ Jun.      Jan. 2, 1900 Assoc. M.      Sept. 3, 1902	
YERFANCE, WILLIAM BURNET.	418 Center St., South Or- ange, N. J. ....	{ Jun.      May 3, 1892 Assoc. M.      Dec. 2, 1896	
ZARBELL, ELMER.	Asst. Engr., L. & N. R. R. Co., Chf. Engr.'s Office, Louisville, Ky. ....	{ Jun.      Jan. 3, 1899 Assoc. M.      Feb. 7, 1900	
ZELLER, ALBERT HENRY.	1000 Fullerton Bldg., St. Louis, Mo. ....	{ Jun.      May 7, 1890 Assoc. M.      April 7, 1897	

Associate Members, 728.

## ASSOCIATES.

[Assoc. Am. Soc. C. E.]

		Date of Membership.	
ABBOTT, EDWARD LORENZO.	71 Broadway, New York City...	{ Jun. Sept. 1, 1886 Assoc. April 30, 1895	
ABBOTT, WILLIAM LATHAM.	541 Wood St., Pittsburg, Pa.....	May 1, 1889	
ACKERMAN, ERNEST ROBINSON.	1 Broadway, New York City.....	May 1, 1900	
AUCHINCLOSS, JOHN WINTHROP.	22 William St., New York City.....	April 2, 1901	
BARNES, WILLIAM HENRY.	Pres., Allegheny Val. Ry. Co. and West. N. Y. & Penn. Ry. Co., 256 Gen. Office, P. R. R. Co., Philadel- phia, Pa.....	Sept. 2, 1885	
BELDEN, EDGAR TWEEDY.	Lawn Ave., Middletown, Conn.....	Mar. 5, 1901	
BENNETT, LESLIE J. Secy.,	Buffalo Cement Co., Ltd., 110 Franklin St., Buffalo, N. Y.....	Jan. 7, 1902	
BENT, STEDMAN.	Purchasing Agt., The Penna. Steel Co., Overbrook, Montgomery Co., Pa.....	Dec. 2, 1902	
BERTHELET, JOSEPH R.	Mgr., Milwaukee Cement Co., Milwaukee, Wis.....	Nov. 1, 1898	
BOGART, SAMUEL STOCKTON.	Real Estate, 489 Fifth Ave., New York City (Res., Dumont, N. J.).....	April 7, 1886	
BOOTH, WILLIAM FERRIS.	Cons. Engr., Transit Finance Co., { Jun. Jan. 7, 1885 170 Broadway, New York City..... { Assoc. April 30, 1895		
BRADLEY, CHARLES WHITING.	1064 Ellicott Sq., Buffalo, N. Y.....	June 19, 1891	
BRAINE, LAWRENCE FULTON.	Gen. Mgr., Continuous Rail Joint Co. of America, Newark, N. J.....	Sept. 6, 1898	
BROWN, THASE ROSS.	With Wisconsin Bridge & Iron Co., { Jun. Mar. 31, 1896 Box L, North Milwaukee, Wis..... { Assoc. Oct. 2, 1900		
BURNHAM, GEORGE, JR.	(Burnham, Williams & Co.), Baldwin & Jun. Jan. 6, 1875 Locomotive Works, Philadelphia, Pa..... { Assoc. July 2, 1890		
BURROWS, GEORGE LORD.	Saginaw, W. S., Mich.....	Feb. 3, 1886	
CHAPMAN, MELLVILLE DOUGLAS.	80 Broadway, New York City.....	Sept. 1, 1896	
CHURCH, IRVING PORTER.	Prof. of Applied Mechanics and Hydraulics, Cornell Univ., Ithaca, N. Y.....	Oct. 1, 1901	
CLARK, LUDLOW VICTOR.	619 Harrison Bldg., Philadelphia, Pa.....	Oct. 4, 1892	
COLSTEN, ALBERT LLOYD.	Master of Applied Math., Tome Inst., Port Deposit, Md.....	Sept. 3, 1901	
COMFORT, SILAS GILDERSLEEVE.	Vice-Pres. and Prof. of Eng., Pennsylv- vania Military Coll., Chester, Pa.....	Mar. 31, 1891	

# ASSOCIATES C-G

	Date of Membership.
COMPTON, ALFRED G. Prof. of Physics in The Coll. of the City of New York, 17 Lexington Ave. (Res., 40 West 126th St.), New York City.....	Sept. 5, 1877
COPELAND, WILLIAM ROGERS. 1904 Green St., Philadelphia, Pa.....	Feb. 4, 1902
CRAFTS, GEORGE HENRY. Civ. Engr. and Bridge Contr., 164 Forest Ave., Atlanta, Ga.....	April 4, 1888
CURRIER, CHARLES GILMAN. 313 West 102d St., New York City.....	June 21, 1894
DEWEY, CHARLES ELLIS. 28 Flower Bldg., Watertown, N. Y.....	Nov. 5, 1901
DIVEN, JOHN M. Secy. and Treas., Elmira Water, Light & R. R. Co., Elmira, N. Y.....	Sept. 10, 1891
DOUGLASS, ANTHONY CHILEON. Gen. Contr., Niagara Falls, N. Y.....	April 30, 1895
DRUMMOND, THOMAS JOSEPH. Pres., Londonderry Iron & Min. Co., Ltd., Montreal, Que., Canada.....	Mar. 6, 1894
DUBARRY, EDMUND LOUIS. Supt., Terminals, N. & W. Ry., Norfolk, Va.....	Jan. 6, 1875
ECKEL, EDWIN CLARENCE. Asst. Geologist, U. S. Geological Survey, Washington, D. C.....	Mar. 5, 1901
ELLIOTT, HOWARD. Gen. Mgr., Burlington Route, 604 Pine St., St. Louis, Mo.....	June 5, 1900
FARRELL, EDWARD JAMES. 355 West 145th St., New York City.....	June 6, 1899
FISHBURNE, EDWARD BELL, Jr. Pres., Hoge Memorial Military Academy, Blackstone, Va.....	Dec. 5, 1899
FISK, WILBUR CHAPMAN. 24 Nassau St., New York City.....	Oct. 4, 1892
FLETCHER, ROBERT. Director of Thayer School of Civ. Eng., Dartmouth Coll., Hanover, N. H.....	Nov. 4, 1874
FOSTER, CLARENCE MARVIN. 920 Chamber of Commerce Bldg., Chicago, Ill.....	Jan. 31, 1899
FREEMAN, FRANK LESLIE. 1756 N St., Washington, D. C.....	Nov. 5, 1895
FROST, GEORGE HENRY. Pres., The Eng. News Pub. Co., 220 Broadway, New York City.....	Jan. 4, 1882
FULLER, ALMON HOMER. Prof. of Civ. Eng., Univ. of Wash- } ington, University Station, Seattle, Wash..... { Assoc.	Jun. April 4, 1899 Feb. 4, 1902
FUTAMI, KYOSABURO. Prof. of Civ. Eng., Kyoto Imperial Univ., Kyoto, Japan.....	June 5, 1889
GAINES, FRANKLIN LINCOLN. Vice-Pres. and Gen. Supt. of Constr., Grand Rapids Bridge Co., 612 Pythian Temple, Grand Rapids, Mich.....	April 1, 1902
GIBSON, WILLIAM, Jr. 122 Fenimore St., Brooklyn, N. Y.....	Sept. 5, 1888
GILDERSLEEVE, ALGER CROCHERON. Civ. Engr. and Contr., } 215 West 125th St., New York City..... { Assoc.	Jun. Feb. 6, 1894 April 4, 1899
GOLDSBOROUGH, JOHN BYRON. Supt. Constr., New Croton Dam, Croton-on-Hudson, N. Y.....	April 4, 1899
GOODELL, JOHN MILTON. Park Hotel, Sault Ste. Marie, Mich.....	July 29, 1891
GOODMAN, EDWARD HARRIS. Swissvale, Allegheny Co., Pa.....	June 4, 1891



# ASSOCIATES G-M

Date of Membership.

GRAHAM, WILLIAM WOODMAN. Care, American Bank, City of Mexico, Mexico .....	Dec. 6, 1898
GRIFFIN, PATRICK HENRY. Pres., New York Car Wheel Works, Buffalo, N. Y .....	Oct. 1, 1890
HARDWICKE, ALAN HYDE GARDNER. With Niagara Falls Power Co., Niagara Falls, N. Y.....	June 4, 1884
HARRIS, CHARLES MARSHALL. 58 William St., New York City. ....	Jan. 8, 1873
HARRISON, LOUIS BALDWIN. Fifth Ave. Hotel, Troy, N. Y.....	May 5, 1896
HARTMAN, WILLIAM GARRIGUES. Pres., Wm. G. Hartman Cement Co., Real Estate Trust Bldg., Broad and Chestnut Sts., Phila- delphia, Pa.....	May 3, 1898
HAZEN, JOHN VOSE. Prof. of Civ. Eng., Dartmouth Coll., Hanover, N. H.....	June 5, 1889
HENNESSEY, CHARLES FRANCIS ASA. 948 Park Ave., New York City....	Jan. 7, 1902
HUSKINER, MILLARD. 4 Park St., Park Lane, London, W., England. .	June 5, 1889
HUSTON, JAMES ARCHIBALD. Gen. Mgr., Am. Bridge Co., 826 Frick Bldg., Pittsburg, Pa.....	Aug. 31, 1897
JACOBY, HENRY SYLVESTER. Prof. of Bridge Eng., Cornell Univ., 7 Reservoir Ave., Ithaca, N. Y.....	Nov. 5, 1890
JOHNSTON, JOHN PARRY. 822 Marquette Bldg., Chicago, Ill.....	April 3, 1894
KALTENBACH, HENRY JULIUS. Park Hill, Yonkers, N. Y.....	June 3, 1902
KARNER, WILLIAM JOSIAH. Chf. Engr.'s Office, Ill. Cent. R. R. Co., Chicago, Ill.....	July 2, 1890
KELLER, OTTO BALTHAZAR. 127 Fulton St., New York City.....	Feb. 3, 1903
KELLEY, JAMES AUGUSTUS. Engr. for F. H. Clement & Co., Contrs., 32 South Broad St., Philadelphia, Pa.....	Mar. 5, 1901
KING, HARRY WHEELOCK. Vice-Pres., The King Bridge Co., Cleve- land, Ohio.....	June 19, 1891
KING, WALLACE, Jr. Vice-Pres., United Bldg. Material Co., 13 Park Row, New York City .....	Dec. 4, 1900
LaFARGE. OLIVER HAZARD PERRY. 341 Arcade Bldg., Seattle, Wash..	April 5, 1898
LESLEY, ROBERT WHITMAN. Pres., Am. Cement Co., 22 South 15th St., Philadelphia, Pa .....	Jan. 31, 1893
LIEBMANN, ALFRED. 58 West 58th St., New York City.....	June 3, 1902
LINDENBERGER, CASSIUS HOWARD. Defiance, Ohio .....	Feb. 2, 1892
LIVINGSTON, JULIUS I. Bound Brook, N. J.....	July 3, 1889
LOWE, HOUSTON. Vice-Pres., Lowe Bros. Co., Dayton, Ohio.....	June 3, 1902
McKENNA, CHARLES FRANCIS. Chemist, 221 Pearl St., New York City.	June 5, 1894
MAIGNEN, JEAN PROSPER AUGUSTE. 1310 Arch St., Philadelphia, Pa.	Oct. 3, 1899
MANN, JOHN LAROC. Hanover, N. H.....	{ Jun. April 2, 1901
	{ Assoc. May 6, 1902
MEYER, HENRY CODDINGTON, Jr. Cons. Mech. Engr., 114 { Jun. Jan. 3, 1893	
Liberty St., New York City.....	{ Assoc. Dec. 28, 1900

## ASSOCIATES M-S

	Date of Membership
MONKS, JOHN, Jr. 130 Water St. (Res., 139 West 121st St.), New York City.....	May 31, 1898
MOXHAM, ARTHUR JAMES. Pres., Hazard Powder Co., Wilmington, Del.....	Nov. 2, 1887
NORTON, HENRY LORD. Engr. and Contr., (Collins & Norton), 33 Lyman St., Springfield, Mass.....	May 4, 1897
OASTLER, WILLIAM CHURCHILL. 156 Fifth Ave., New York City.....	Mar. 31, 1891
ODELL, RUTLEDGE IRVING. Tomkins Cove, N. Y.....	Oct. 1, 1895
PACKARD, RALPH GOODING, Jr. Vice-Pres., R. G. Packard Co., 130 Pearl St., New York City .....	Sept. 3, 1901
PALMER, WILLIAM PENDLETON. Gen. Mgr., Am. Steel & Wire Co., Western Reserve Bldg., Cleveland, Ohio .....	Mar. 3, 1896
PARSONS, GEORGE WELLMAN. Supt., Frog, Switch and Signal Dept., The Pennsylvania Steel Co., Steelton, Pa.....	Sept. 3, 1884
PEVERLEY, RALPH. 156 Fifth Ave., New York City.....	Dec. 6, 1898
PHILLIPS, HENRY AYLING. Archt., 120 Tremont St., Boston, Mass...	April 7, 1886
PHIPPS, LAWRENCE COWLE. Carnegie Bldg., Pittsburg, Pa.....	Jan. 31, 1899
PINCHOT, GIFFORD. Forester, U. S. Dept. of Agriculture, and Chf. of Bureau of Forestry (Res., 1615 Rhode Island Ave.), Washington, D. C.....	Mar. 4, 1902
PIPER, ALEXANDER ROSS. Capt., U. S. A. ( <i>Retired</i> ); Deputy Police Commr., New York City, 259 Eighty-fifth St., Brooklyn, N. Y..	June 5, 1900
POLK, WILLIAM ANDERSON. 42 Hudson St., New York City.....	May 4, 1897
POMEROY, LEWIS ROBERTS. Care, Gen. Elec. Co., 44 Broad St., New York City.....	April 2, 1890
PRATT, ROBERT JAMES. With Honolulu Iron Works Co., Honolulu, Hawaiian Islands.....	May 4, 1887
QUINCY, CHARLES FREDERICK. Pres. and Treas., The Q. & C. Co., 620 Western Union Bldg., Chicago, Ill.....	Feb. 4, 1896
QUIRK, EUGENE McGRATH. Mgr., Montreal Quarry Co., 266 Boulevard, Ville St. Louis, Montreal, Que., Canada.....	Feb. 3, 1903
RANSOME, ERNEST LESLIE. Cons. Engr., 11 Broadway, New York City .....	June 5, 1894
RICHARDSON, CLIFFORD. Director, New York Testing Laboratory, Long Island City, N. Y. (Res., 122 East 34th St., New York City)....	Oct. 4, 1892
ROBERTS, WILLIAM. 540 South St., Waltham, Mass.....	June 4, 1884
ROGERS, EDWARD ALVERSON. Care, James Stewart & Co., Eng. Contrs., 2 St. Peter's Sq., Manchester, England.....	Dec. 1, 1896
SAEGER, CHARLES MARSHALL. Gen. Mgr., Coplay Cement Mfg. Co., 1320 Hamilton St., Allentown, Pa.....	May 2, 1893
SAPH, AUGUSTUS VALENTINE. Instr. in Civ. Eng., Univ. of Cal. (Res., 2034 Durant Ave.), Berkeley, Cal.....	Oct. 1, 1901
SAWYER, JACOB HERBERT. 402 Marlborough St., Boston, Mass.....	May 1, 1900

## ASSOCIATES S-Z

		Date of Membership.	
SELL, WILLIAM DRUMM.	Room 6, Charleston National Bank Bldg. (P. O. Box 222), Charleston, Kanawha Co., W. Va.	{ Jun. Dec.	3, 1891
		{ Assoc.	May 2, 1899
SMITH, FRANCIS HOPKINSON.	16 Exchange Pl., New York City	April	5, 1892
SMITH, HERBERT STEARNS SQUIER.	Prof. of Applied Mechanics, Princeton Univ., P. O. Box 171, Princeton, N. J.	Sept.	10, 1891
SPEED, JAMES BRECKINRIDGE.	Pres., Western Cement Assoc., Louisville, Ky.	May	2, 1888
STEARNS, FRED LINCOLN.	Dist. Supt., Dept. of St. Cleaning, 52 West 126th St., New York City	June	3, 1902
STOUDEK, JOHN BURTON.	Roadmaster, C. & N. W. Ry., Mason City, Iowa	{ Jun. Mar.	6, 1900
		{ Assoc.	May 6, 1902
STOWE, CHARLES BROWN.	Superior Bldg., Cleveland, Ohio	Oct.	4, 1898
TENNEY, GEORGE OLIVER.	Contr., Spartanburg, S. C.	{ Jun. Sept.	7, 1887
		{ Assoc.	Feb. 5, 1901
THORN, ALFRED WILLIAM.	Gen. Mgr., Thorn Cement Co., 112 Church St., Buffalo, N. Y.	Oct.	2, 1900
TOMKINS, CALVIN.	120 Liberty St., New York City	Jan.	6, 1886
TRAUTWINE, JOHN CRESSON, JR.	257 South Fourth St., Philadelphia, Pa.	Dec.	5, 1888
TRIEST, WOLFGANG GUSTAV FELIX.	Vice-Pres., Share & Triest, 39 Cortlandt St., New York City	{ Jun. Sept.	3, 1890
		{ Assoc.	Mar. 6, 1900
TURRILL, SHERMAN MARSH.	Asst. Engr. with Allen & Farrington, Municipal Engrs., Syracuse, N. Y.	Oct.	1, 1901
WARDER, JOHN HAINES.	Secy., Western Society of Engrs., 1737 Monadnock Blk., Chicago, Ill.	Mar.	7, 1888
WATKINS, JOHN ELFRETH.	Chf. of Bldgs., Supt. and Curator of Technology, U. S. National Museum, Washington, D. C.	Jan.	2, 1889
WATSON, MERRILL.	Treas. and Mgr. New York Expanded Metal Co., 256 Broadway, New York City	Oct.	7, 1902
WEBER, GEORGE ADAM.	Secy., The Weber Ry. Joint Mfg. Co., 71 Broadway, New York City	Feb.	6, 1900
WELLS, JOSEPH AGUR.	The Fairbanks Co., cor. Broome and Elm Sts., New York City	Jan.	7, 1896
WILLSON, FREDERICK NEWTON.	Prof. of Descriptive Geometry and Technical Drawing, Princeton Univ., Box 63, Princeton, N. J.	{ Jun. Sept.	5, 1883
		{ Assoc.	Oct. 4, 1892
YOUNG, CHARLES GRIFFITH.	Gen. Supt. of Constr., J. G. White & Co., 29 Broadway, New York City	Mar.	6, 1894
ZIPPERLEIN, JOSEPH WILLIAM.	Vice-Pres., Wm. G. Hartman Cement Co., Real Estate Trust Bldg., Philadelphia, Pa.	June	4, 1901

## JUNIORS.

[Jun. Am. Soc. C. E.]

	Date of Membership.
ADAMS, ARTHUR. Asst. Engr. in Chg. Constr., Mo-i-Ranen, Norway..	Oct. 1, 1901
ADAMS, EDWARD MAGUIRE. 1st Lieut., Corps of Engrs., U. S. A., Washington Barracks, D. C.....	Oct. 7, 1902
ADAMS, RAYMOND EDMOND. Asst. Civ. Engr., Quartermaster-General's Office, State, War & Navy Bldg., Washington, D. C.....	May 1, 1900
ADEY, JOHN SEAGER. 445 Lenox Ave., New York City.....	Feb. 3, 1903
ALLEN, WALTER HINDS. Asst. Engr., N. Y., N. H. & H. R. R., New Haven, Conn.....	May 1, 1900
ARMSTRONG, ALEXANDER FLOYD. Second Asst. Engr., Manila, Philippine Islands.....	Oct. 7, 1902
ARN, WILLIAM GODFREY. Asst. Engr., L. & N. R. R., Montgomery, Ala.	Oct. 2, 1900
BAKER, HAROLD JAMES MANNING. 408 Jefferson St., Port Townsend, Wash.....	Oct. 7, 1902
BAKER, SHIRLEY. Asst. Engr., Excelsior Wooden Pipe Co., 204 Front St., San Francisco, Cal.....	Sept. 11, 1900
BARNES, WALTER ESMOND. 45 Lincoln St., Malden, Mass.....	May 6, 1902
BASSETT, ROBERT JAY. 25 North Fourth St., Steelton, Pa.....	Feb. 3, 1903
BAXTER, DAVID ELDER. 32 West 60th St., New York City.....	May 2, 1899
BEACH, JAMES GEORGE. Care, Geo. A. Fuller Co., North American Bldg., Philadelphia, Pa.....	Aug. 31, 1897
BEEKMAN, JOHN VAN DERVEER, Jr. Care, Purdy & Henderson, 101 Tre- mont St., Boston, Mass.....	Sept. 3, 1901
BELCHER, WALLACE EDWARD. Structural Draftsman, Am. Bridge Co., Pencoyd, Pa.....	Dec. 2, 1902
BELL, BERTRAND FAUGÈRES. 120 East 22d St., New York City.....	June 3, 1902
BELZNER, THEODORE. Insp. of Steel Constr., Manhattan Val. Viaduct (4th Div., Section 12), Rapid Transit R. R., 231 West 125th St. (Res., 142 West 67th St.), New York City.....	Oct. 5, 1897
BENTON, LEWIS STEUERWALD. Asst. to Engr., M. of W. and Bldgs., Inter-Urban St. Ry. Co., 621 Broadway, New York City.....	Nov. 5, 1901
BERRY, FRANCIS RIGDON. Care, Birmingham Water-Works Co., Bir- mingham, Ala.....	Dec. 2, 1902
BISSELL, CLINTON TALCOTT. Instrumentman, Div. No. 1, Atlantic Ave. Impvt., L. I. R. R., 5 Hanson Pl., Brooklyn, N. Y.....	Mar. 4, 1902
BLACKWELL, PAUL ALEXANDER. (With Fort Pitt Bridge Works), Canonsburg, Pa.....	Dec. 4, 1900

# JUNIORS B-C

Date of Membership.

BLANCHARD, ARTHUR HORACE. Instr. in Civ. Eng., Brown Univ., Providence, R. I.....	Jan. 2, 1900
BOARDMAN, HOWARD EDWARD. Instrumentman, Penn., N. Y. & L. I. R. R. Co., 227 West 33d St., New York City.....	Oct. 7, 1902
BOUTON, GEORGE HAROLD. Special Asst. Engr., Jersey City Water Supply Co., Boonton, N. J.....	May 2, 1899
BOWDITCH, ERNEST W. Landscape Gardener and Civ. Engr., 68 Devonshire St., Boston, Mass.....	Feb. 3, 1875
BRISLEY, EDWARD BETTS. Mech. Engr., with Chf. Engr., Manhattan Ry. Co., 102 West 75th St., New York City....	Dec. 2, 1902
BROWN, COLLINGWOOD BRUCE, Jr. Res. Engr., Canadian Pacific Ry., London, Ont., Canada.....	Oct. 1, 1901
BROWN, WILLIAM CLINTON. Box 14, Brooklyn (Res., Dongan Hills), N. Y.	Sept. 1, 1886
BRUSH, WILLIAM WHITLOCK. Asst. Engr., Dept. of Water Supply, Gas and Electricity, Room 41, Municipal Bldg., Brooklyn, N. Y.....	Mar. 3, 1896
BUCK, HENRY ROBINSON. Asst. City Engr., Hartford, Conn.....	June 5, 1900
BUMSTED, EUGENE BRADFORD. Res. Mgr., St. Lawrence River Power Co., Massena, St. Lawrence Co., N. Y.....	May 1, 1900
BUNNEL, WILLIAM CYRUS. Junior Engr., U. S. Engr. Office, Custom House, Charleston, S. C.....	Oct. 1, 1901
BURGESS, GEORGE HECKMAN. Asst. Engr., Penn. Lines W. of Pitts., Union Station, Pittsburg, Pa.....	Feb. 1, 1898
BURROWES, HARRY GILBERT. Res. Engr., Atlantic Ave. Impvt., L. I. R. R., 5 Hanson Pl., Brooklyn, N. Y.....	Sept. 2, 1902
BURWELL, ROBERT LEMMON. Transitman under S. W. Hayes for Westinghouse, Church, Kerr & Co., Schnirel Bldg., Geneva, N. Y....	Dec. 3, 1901
CÁCERES, SIMON NOVELO. Box 255, National City, Cal.....	June 6, 1899
CAMERON, JOHN BOBBS. Asst. Div. Engr., B. & O. R. R., Chillicothe, Ohio.....	Oct. 2, 1900
CARLIN, JOSEPH PATRICK. Care, P. J. Carlin & Co., 26 Court St. (Res., 113 Clinton Ave.), Brooklyn, N. Y.....	Oct. 4, 1898
CARNEY, EDWARD JOSEPH. Dept. of Bridges, 19 Park Row (Res., 527 West End Ave.), New York City.....	Feb. 1, 1898
CARPENTER, ALLAN WADSWORTH. Supervisor, Bridges and Bldgs., N. Y. C. & H. R. R. R., Jersey Shore, Pa.....	Mar. 5, 1901
CHADBOURN, WILLIAM HOBBS, JR. U. S. Asst. Engr., U. S. Engr. Office, Beaver, Pa. ....	Dec. 3, 1890
CLARK, JOHN A., Jr. Supt. of Distrib., Essex & Hudson Gas Co., 260 North Park St., East Orange, N. J.....	Aug. 31, 1897
CLARK, WILLIAM GEORGE. Civ. and Cons. Engr., 1042 Spitzer Bldg., Toledo, Ohio.....	April 4, 1888
CLARKE, ST. JOHN. Bogota, N. J.....	Sept. 5, 1888
CLEAVER, PITSON JAY. 113 Henry St., Brooklyn, N. Y.....	April 4, 1899
COBB, SAMUEL ALLEN. Room 17, Homestead Bldg., Muskogee, Ind. T.	June 3, 1902
CODWISE, HENRY ROGERS. Instr. in Eng., Poly. Inst. of Brooklyn; Instr. in Eng. Field Work and Math., Cooper Union Schools of Science and Art, New York City.....	April 2, 1901



## JUNIORS C-F

	Date of Membership.
COLBY, SAFFORD KINKEAD. Eastern Agt., The Pittsburg Reduction Co., 99 John St., New York City.....	Mar. 5, 1895
CONNICK, HARRIS DE HAVEN. Asst. Engr., Dept. of Public Works, City Hall, San Francisco, Cal.....	Jan. 3, 1899
CONROW, HERMAN. Dept. of Docks and Ferries, Pier A, New York City.....	May 3, 1898
CORNELL, JOHN NELSON HAYWARD. 312 Manhattan Ave., New York City	May 1, 1889
CORRIGAN, GEORGE WASHINGTON. Div. Engr., Mo. Pac. Ry., Arkana, Ark.....	Feb. 5, 1901
CRANE, WILL EDWIN. 18 Broadway, Room 803, New York City.....	May 1, 1889
CRAWFORD, JOSEPH EMMANUEL. Fox Chase, Philadelphia, Pa.....	Dec. 5, 1899
CROOK, JOHN ANTHONY. Chf. Engr., The John Gilligan Co., Falls City, Nebr.....	Feb. 3, 1903
CULGIN, GUY WHITMORE. Asst. Engr., Rapid Transit R. R. Comm. (Res., 133 West 129th St.), New York City.....	Mar. 6, 1900
CUMMINGS, NOAH. With Dept. of Bridges, East River Bridge No. 4, 252 West 135th St., New York City.....	Mar. 3, 1896
DARROW, MARIUS SCHOONMAKER. Chf. Engr.'s Office, C., B. & Q. Ry., 209 Adams St., Room 67, Chicago, Ill.....	Feb. 6, 1900
DAVIS, GEORGE JACOB, JR. Instr. in Civ. Eng., Univ. of Wisconsin, 1104 West Johnson St., Madison, Wis.....	Nov. 4, 1902
DAY, ARTHUR MORTIMER. 551 West End Ave., New York City.....	May 1, 1900
DE LA MORA, MANUEL. Apartado 319, Guadalajara, Mexico.....	Dec. 28, 1900
DIEHL, GEORGE CONRAD. (Guthrie & Diehl), 836 Ellicott Sq., Buffalo, N. Y.....	Feb. 4, 1896
DIMOND, JAMES RENWICK. 20 West 73d St., New York City.....	Sept. 3, 1901
DIXON, DE FOREST HALSTED. 166 Remsen St., Brooklyn, N. Y.....	May 3, 1898
DOUGAN, JAMES. Asst. Engr., with Clinton & Russell, 32 Liberty St., New York City.....	Mar. 5, 1901
DOUGHERTY, RICHARD ERWIN. 244 West 20th St., New York City.....	Jan. 6, 1903
DUNNELLS, CLIFFORD GEORGE. Contr. Dept., Am. Bridge Co., 826 Frick Bldg., Pittsburg, Pa.....	Feb. 4, 1902
DUSENBERRY, WALTER LORTON. 220 Tenth St., South Brooklyn, N. Y.	Nov. 5, 1890
EDWARDS, OLIVER CROMWELL, Jr. Transitman, Mingo Bridge over Ohio River, Mingo Junction, Ohio, for Wabash R. R.; Address, 508 N. Fifth St., Steubenville, Ohio.....	Oct. 7, 1902
ELY, JOHN ANDREWS, JR. 21 East 55th St., New York City.....	April 30, 1901
ENOS, GEORGE WALLACE. Contrs.' Plant, Tools and Supplies, 27 Will- iam St., New York City.....	Mar. 6, 1900
ENZIAN, CHARLES. Transitman, L. V. Coal Co. (Res., 171 N. Frank- lin St.), Wilkesbarre, Pa.....	Sept. 3, 1901
FALK, MYRON SAMUEL. Tutor, Dept., Civ. Eng., Columbia Univ. (Res., 63 East 74th St.), New York City.....	Feb. 4, 1902
FIRTH, ELMER WALLACE. Dept. of Sewers (Res., 473 Fourteenth St.), Brooklyn, N. Y.....	Jan. 7, 1896

# JUNIORS F-H

Date of Membership.

FISHER, WAGER. Contr. Engr., 1420 Chestnut St., Philadelphia, Pa. . . . .	Oct. 3, 1899
FLYNN, BENJAMIN HARRISON. Engr. to the Ohio State Board of Health (Res., 102 Wilson Ave.), Columbus, Ohio. . . . .	Oct. 2, 1900
FORBES, HENRY DE BRETTON. Engr., H. E. Talbott & Co., Dayton, Ohio. . . . .	Dec. 4, 1900
FORD, WILLIAM HAYDEN. 506 Hale Bldg., Philadelphia, Pa. . . . .	Nov. 5, 1895
FRASER, CHARLES EDWARD. Engr. in Chg., Park Ave. Tunnel, Rapid Transit Subway, 153 Lenox Ave., New York City. . . . .	June 4, 1901
FUJINO, SHUKICHI. Bridge Engr., Nippon Tetsudo Kwaisha, Tokyo, Japan. . . . .	Feb. 3, 1903
FULLER, ANDREW DANIEL. Cons. and Contr. Engr., 3 Hamilton Pl., Boston, Mass. . . . .	Dec. 6, 1898
FULLER, CARL HAMILTON. Estimating Dept., Am. Bridge Co. of New York, Chicago Office, Chicago, Ill. . . . .	Mar. 5, 1901
FURMAN, JOB ROCKFIELD. Engr., Otis Elevator Co., 71 Broadway, New York City. . . . .	July 2, 1890
GARTENSTEIG, CHARLES. Asst. Engr., Bureau of Highways, Bronx Borough, 14 East 87th St., New York City. . . . .	Oct. 6, 1896
GEORGE, HUGH MELVIN. Care, Water Co., Meridian, Miss. . . . .	Feb. 3, 1903
GETCHELL, WILLIAM STEWART. Care, W. M. Porter, Asst. Chf. Engr., Colorado Fuel & Iron Co., Denver, Colo. . . . .	Sept. 2, 1902
GIFFORD, HARRY VAN VLECK. Bradner, Ohio . . . . .	Mar. 5, 1901
GOODRICH, ERNEST PAYSON. Chf. Engr., Bush Cos., Coffee Exchange Bldg., New York City. . . . .	April 3, 1900
GOODRIDGE, JOHN WESLEY. Asst. Engr., Rapid Transit R. R. Comm., 1st Div., 13 Astor Pl., New York City (Res., 292 Marlborough Rd., Brooklyn, N. Y.). . . . .	Oct. 4, 1898
GOERMLY, WALTER BRUCE. Engr., Commrs. of Accounts, 280 Broadway, New York City. . . . .	Mar. 31, 1896
GOULD, JOHN WARREN DU BOIS. 10 East Fourth Ave., Spokane, Wash. . . . .	Oct. 7, 1902
GRANBERY, JULIAN HASTINGS. 561 Walnut St., Elizabeth, N. J. . . . .	Sept. 6, 1898
GRAVES, WILLARD FRANKLIN. Treas. and Gen. Mgr., Le Bosquet Coal & Min. Co., Shawnee, Okla. . . . .	Oct. 31, 1899
GRAY, JOHN COLIN. 36 Garden Pl., Brooklyn, N. Y. . . . .	June 4, 1901
GREEN, FRANCIS CUSHING. Gen. Mgr., Consolidated Car-Heating Co., 413 North Pearl St., Albany, N. Y. . . . .	Feb. 4, 1896
GRIMM, HENRY ENGLAND. Asst. Engr. with S. Bent Russell, Cons. Engr., 417 Pine St. (Res., 3213 Eads Ave.), St. Louis, Mo. . . . .	Oct. 2, 1900
HAIGHT, HORACE DE REMER. Engr. for Thos. Prosser & Son, 15 Gold St., New York City. . . . .	May 1, 1900
HALL, CHARLES WARD. 140 Nassau St., New York City. . . . .	Sept. 6, 1898
HALL, FREDERIC FRANCIS. 2335 Warring St., Berkeley, Cal. . . . .	June 5, 1900
HALL, MARTIN WELCH. Bureau of Sewers, Borough of the Bronx, New York City . . . . .	Oct. 1, 1901
HAMILL, ALEXANDER, JR. Jersey City, N. J. . . . .	Dec. 28, 1900
HAMMER, ROBERT HENRY. 4 Dean St., Brooklyn, N. Y. . . . .	Jan. 7, 1902
HANEY, LEWIS TUSTLER. Alexandria, Va. . . . .	Oct. 7, 1902

## JUNIORS H-K

	Date of Membership.
HARRY, ISAAC. Civ. Engr. with John A. Roebling's Sons Co., 301 Spring St., Trenton, N. J.....	June 6, 1899
HARDING, WILLIAM STEWART. Bituminous Coal Operator (Harding & McCausland), 815 Arcade Bldg., Philadelphia, Pa.....	Nov. 3, 1896
HARRINGTON, FRANCIS BURCHARD. Asst. Supt. of Signals, Mohawk Div., N. Y. C. & H. R. R. Co., 93 Ten Broeck St., Albany, N. Y. ....	Sept. 11, 1900
HARRINGTON, HARRY GARFIELD. Asst., Eng. Dept., The New Jersey Zinc Co., 11 Broadway, New York City.....	Jan. 7, 1902
HARRIS, HENRY ALEXANDER. Princeton, N. J.....	Oct. 31, 1899
HARSHBARGER, ELMER DWIGHT. Rolla, Mo.....	Nov. 5, 1901
HARWI, SOLOMON JACOB. Civ. Engr. for The Babcock & Wilcox Co., New York City (Res., 910 Avenue C, Bayonne, N. J.).....	Dec. 4, 1889
HAWES, ARCHIE McLEAN. Cons. Engr., 402 Berlin Bldg., Tacoma, Wash.....	Nov. 2, 1887
HAYDEN, EDWIN CLAPP. Asst. Supt., Section 73, Met. High Level Sewer, Monument Sq., Jamaica Plain, Mass.....	Oct. 1, 1901
HEALD, EDWARD CRESWELL. P. O. Box 72, Harrisburg, Pa.....	Oct. 7, 1902
HENLEY, ROBERT DWIGGINS MONTEITH. Care, Chf. Engr.'s Office, L. & N. R. R. (10th and Broadway), Louisville, Ky.....	Sept. 3, 1901
HIGGINSON, JONATHAN YATES. 216 East 15th St., New York City.....	Oct. 1, 1901
HILL, STIRLING BRYANT. 1633 Bellevue Ave., Seattle, Wash.....	Oct. 7, 1902
HOLLIDAY, ALEXANDER RIEMAN. Asst. Engr., Penn. Co., New Castle, Pa.....	Oct. 7, 1902
HOPPER, JOHN JACOB. Civ. Engr. and Contr., 215 West 125th St., New York City.....	May 5, 1886
HORTON, ALBERT HOWARD. 33 Campau Bldg., Detroit, Mich.....	June 3, 1902
HORTON, SANDFORD. 316 Virginia Ave., Room 9, Indianapolis, Ind....	Feb. 7, 1877
HOW, RICHARD WILLIS. Care, Atlantic Ave. Impvt., 44 Court St., Brooklyn, N. Y.....	June 6, 1899
HOWARD, ERNEST EMMANUEL. Care, Waddell & Hedrick, 608 New Nelson Bldg., Kansas City, Mo.....	Dec. 3, 1901
HOWE, CHARLES EDWARD. With Wabash Screen Door Co., Minneapolis, Minn.....	Mar. 6, 1900
HULSE, SHIRLEY CLARKE. 521 East State St., Ithaca, N. Y.....	Oct. 7, 1902
ILSLEY, ARTHUR BENJAMIN. Asst. Bridge Engr., B. & M. R. R., Care, Chf. Engr.'s Office, Boston, Mass.....	Feb. 28, 1899
IRVING, WALTER EDWARD. Engr. and Contr., 1133 Broadway, New York City.....	Feb. 1, 1898
IVES, HOWARD CHAPIN. Instr. in Civ. Eng., Worcester Pol. Inst., Worcester, Mass.....	Dec. 3, 1901
JACKSON, ROSCOE BRADBURY. Supt. of Constr. of Eng. Bldg. at Univ. of Mich. and Asst. to Dean of Dept. of Eng., Univ. of Mich., 607 Hill St., Ann Arbor, Mich.....	Dec. 2, 1902
KAST, CLARKE NIGHTINGALE. 270 Central Ave., Rochester, N. Y.....	June 4, 1901

# JUNIORS K-M

		Date of Membership.
KELLY, OLAF MORROGH.	Asst. Engr., Williamsburg Bridge, 84 Broadway, Brooklyn, N. Y.....	Dec. 6, 1898
KIBBE, AUGUSTUS SAYRE.	Chf. Engr., The Am. Rys. Co., 905 Witherspoon Bldg., Philadelphia, Pa.....	Mar. 6, 1889
KIMBALL, RALPH CHARLES.	Engr. in Chg. of Grade Changes, Pere Marquette R. R., 72 Delaware Ave., Detroit, Mich.....	Oct. 7, 1902
KLINE, VICTOR WITMER.	Supt. of Constr., The Dravo Contr. Co., Pittsburg, Pa. (Res., 112 Hallett Pl., Bellevue, Pa.).....	Oct. 3, 1899
KOLB, HENRY JACOB.	Care, Dr. Dillworth, Bedford Park, New York City.	Feb. 3, 1903
C. KUMMER, FREDERIC ARNOLD.	Treas. and Gen. Mgr., United States Wood Preserving Co., 29 Broadway, New York City.....	April 30, 1895
LAMBIE, CHARLES SUMNER.	7 Cliff St., Pittsburg, Pa.....	Oct. 1, 1901
LANT, FRANK PARSONS.	21 Park Row, Room 1838, New York City....	Oct. 3, 1888
LATHAM, NORMAN SMITH.	589 Eleventh St., Brooklyn, N. Y.....	July 3, 1889
LAYNG, FRANK RAHN SHUNK.	Asst. Engr., B. & L. E. R. R., Greenville, Pa.....	April 1, 1902
LEE, GEORGE WILLIAM.	Engr. for Sundstrom & Stratton, R. R. Contrs., 143 Liberty St., New York City.....	Mar. 4, 1902
LINDSEY, KIEFFER.	Asst. City Engr., Columbus, Ga.....	Oct. 7, 1902
MACCRACKEN, GEORGE GERE.	University Heights, New York City ....	Feb. 5, 1901
MACDONALD, ARCHIBALD ANGUS.	32 Liberty St., New York City.....	June 4, 1901
MACHEN, HENRY BENNETT.	Asst. Engr., Rapid Transit R. R. Commrs., (Res., 231 West 96th St.), New York City.....	May 2, 1899
McCULLOCH, ROBERT AUSTEN.	80 Hillside Ave., Orange, N. J.....	Sept. 2, 1902
MCDONALD, HARRY PEAKE, Jr.	Asst. Supt., The Sneed & Co. Iron Works, Ft. of Pine St., Jersey City, N. J.....	Oct. 7, 1902
McFETRIDGE, WILLIAM SUTTON.	Asst. Chf. Engr., Little Kanawha R. R. Co., Parkersburg, W. Va.....	May 3, 1898
McHARG, LESLIE.	49 Wall St., Room 1713, New York City.....	Mar. 5, 1901
McKEEVER, WILLIAM.	566 East 164th St., New York City.....	Jan. 2, 1900
MADDEN, JOHN HENRY.	Asst. Engr., Rapid Transit R. R. Comm., 308 West 30th St., New York City.....	Oct. 7, 1902
MANSFIELD, ROYAL JOHN.	Asst. Engr., Riter Conly Mfg. Co., 7724 Hamilton Ave., Pittsburg, Pa.....	Dec. 2, 1902
MASON, FRANCIS.	Care, Penn., N. Y. & L. I. R. R., 225 West 33d St., New York City.....	April 3, 1900
MELICK, NEAL ALBERT.	Draftsman with N. Y. C. & H. R. R. R., Room 512, Grand Central Station, New York City. ....	Dec. 2, 1902
MELIUS, LUDLOW LAWRENCE.	30 South Hawk St., Albany, N. Y. ....	May 2, 1899
MERRIMAN, THADDEUS.	Asst. Engr., Jersey City Water Supply Co., Boonton, N. J.....	April 4, 1899
MERZ, LEON.	S. W. cor. Third and Brown Sts., Philadelphia, Pa....	Mar. 5, 1901
MILLARD, CURTISS.	Gen. Mgr., Chic., Peoria & St. L. Ry., Springfield, Ill.....	April 3, 1889
MILLEB, STANLEY ALFRED.	Asst. Engr. with Chester B. Davis of New York, City Hall, Dallas, Tex.....	Feb. 4, 1902



## JUNIORS M-R

	Date of Membership.
MINOR, EDWARD EASTMAN. 493 Edgewood Ave., New Haven, Conn....	May 1, 1900
MONSARRAT, NICHOLAS DAUBENEY. Supt., Kanawha & Hocking Coal & Coke Co., Longacre, W. Va.....	Feb. 5, 1895
MORE, CHARLES CHURCH. Erecting Dept., Am. Bridge Co. of New York, Pencoyd, Pa.....	May 2, 1899
MORPHY, LUIS GONZAGA. Asst. Engr., N. Y. C. & H. R. R. R., Room 14, Albany Station, Albany, N. Y.....	Feb. 4, 1902
MYERS, CHESTER JOHN. Care, Water Dept., Atlantic City, N. J.....	Oct. 1, 1901
NAYLOR, EZRA BOOTH. 43 Van Sice Ave., Yonkers, N. Y.....	Oct. 1, 1890
NELSON, ALEXANDER HOWARD. 200 Lewis Bldg., Pittsburg, Pa.....	Nov. 1, 1898
NEVILLE, COLONE WILL JACKSON. Eng. Dept., Am. Bridge Works, 120 Van Buren St., Chicago, Ill.....	Oct. 1, 1901
NUTTER, CHARLES HERBERT. 130 West 113th St., New York City.....	Feb. 5, 1901
NYE, ALGERNON SIDNEY. Asst. Engr. to the Aqueduct Commrs., Kings- bridge, New York City.....	July 2, 1890
ORTIZ, EDUARDO. San Juan de Letran No. 3, P. O. Box 2020, City of Mexico, Mexico.....	Nov. 4, 1902
PAINE, GEORGE HEBARD. Cons. Engr., 32 Park Pl., New York City...	Nov. 5, 1890
PARASCHOS, GEORGE THEOPHANES. Regie des Tabacs, Galata, Constan- tinople, Turkey.....	Nov. 4, 1902
PARKER, ASA WARREN. Second Ave. and 67th St., Brooklyn, N. Y....	Sept. 11, 1900
PARKER, CHARLES FREDERIC. Supt. of Socavon Mines, Cia. Minera de Peñoles, Mapimi, Estado de Durango, Mexico.....	June 5, 1900
PARKER, RICHARD DENNY. Asst. Engr., I. & G. N. R. R., Palestine, Tex.....	June 3, 1902
PEARSE, LANGDON. 317 Walnut Ave., Roxbury, Mass.....	Jan. 6, 1903
PERRING, HENRY GARFIELD. Draftsman, Choc., Okla. & Gulf R. R. Co., Little Rock, Ark.....	Dec. 4, 1900
PERRY, GEORGE FRANKLIN. With J. G. White & Co., Ltd., 22a College Hill, E. C., London, England.....	April 3, 1900
PISTOR, GEORGE EMIL JOHN. 518 Broad St., Newark, N. J.....	Dec. 3, 1901
POLLEDO, YSIDORO. Gen. Mgr., Matanzas R. R., Matanzas, Cuba....	Jan. 2, 1889
POTTS, CLYDE. U. S. Junior Engr., 33 Campau Bldg., Detroit, Mich.	Dec. 3, 1901
PRICE, PHILIP WALLIS. Asst. Engr., Great Northern Ry., Great Falls, Mont. (Res., Oakmont, Pa.).....	April 2, 1901
PROCTOR, RALPH FENNO. U. S. Junior Engr., 33 Campau Bldg., De- troit, Mich.....	June 3, 1902
RASTER, WALTHER. With E. C. & R. M. Shankland, 665 Cleveland Ave., Chicago, Ill.....	Feb. 4, 1902
RAY, DAVID HEYDORN. Examiner for Architecture and Eng., Muni- cipal Civ. Service Comm., 61 Elm St., New York City (also Arch. and Engr., 555 West 182d St., New York City).....	Oct. 7, 1902
RAYNOR, CLARENCE WEBSTER. First Asst. Engr., The Midland Bridge Co., Kansas City, Mo.....	Feb. 4, 1902



# JUNIORS R-S

Date of Membership.

REED, WILLIAM BELDEN, Jr. Gen. Mgr., White Mfg. Co., 556 West 34th St., New York City.....	Dec. 1, 1896
RHEA, WILLIAM DOUGLAS. Mgr., The National Fertilizer Co., Nashville, Tenn. (also Craig & Rhea, Mt. Pleasant, Tenn.)....	Oct. 4, 1898
RHETT, EDMUND MOORE. 1st Lieut., Corps of Engrs., U. S. A., Washington Barracks, Washington, D. C.....	Nov. 4, 1902
RICHARDSON, CLINTON LEROY. With The United Coke & Gas Co., Broadway Chambers Bldg., New York City.....	Sept. 2, 1902
RICHARDSON, JOHN FRANCIS. First Asst. Engr., Water, New Orleans Sewerage and Water Board, 602 Carondelet St., New Orleans, La.	Oct. 3, 1899
RIDGWAY, ROBERT. Asst. Engr., Rapid Transit R. R. Comm., 147 Columbus Ave., New York City.....	Feb. 1, 1888
RIEDEL, ARTHUR EMIL. Mech. Engr., 62 William St., New York City.	Nov. 5, 1901
ROHNERT, BENNO. U. S. Asst. Engr., Sault Ste. Marie, Mich.....	April 3, 1889
RUNYON, WILLIAM KERPER. Care, Am. China Development Co., Canton, China . . . . .	April 5, 1898
RYAN, MICHAEL HEALEY. Asst. Engr., Rapid Transit R. R. Comm., 1161 Amsterdam Ave., New York City.....	Dec. 3, 1901
RYDER, ELY MORGAN TALCOTT. 40 Whalley Ave., New Haven, Conn...	Jan. 5, 1897
SABIN, RALPH HARVEY. Pomfret, Conn.....	Oct. 7, 1902
SCHODER, ERNEST WILLIAM. 410 E. Yates St., Ithaca, N. Y.....	Oct. 1, 1901
SCHUMANN, CARL JULIUS. Asst. in Math., Rensselaer Polytechnic Inst., Troy, N. Y.....	Dec. 2, 1902
SELBY, OSCAR ELLSWORTH. Asst. Engr., C., C., C. & St. L. Ry., Cincinnati, Ohio.....	Mar. 4, 1891
SENIOR, FRANK SEARS. With Arthur McMullen & Co., Contrs., Ohio River Bridge, Mingo Junction, Ohio.....	Feb. 28, 1899
SESSER, JOHN CORNELIOUS. Chf. Engr., Ark., Springfield & N. W. Ry., Springfield, Mo.....	Sept. 5, 1899
SHIRE, MOSES EDMUND. Engr. in Chg., Chicago Union Transfer Ry. Co., 355 Dearborn St., Chicago, Ill . . . . .	April 2, 1901
SHRYOCK, JOSEPH GRUNDY. Eng. Dept., Am. Bridge Co., Wissahickon, Philadelphia, Pa.....	April 2, 1901
SINNICKSON, GEORGE ROSENGARTEN. Asst. Supervisor, P. R. R., Tacony, Pa. . . . .	Sept. 5, 1899
SKELLY, JAMES WILLIAM. Junior Engr., U. S. Engr. Office, Custom House, St. Louis, Mo.....	May 2, 1899
SMITH, CHARLES HORTON. City Engr., Room 5, Times Bldg., Middletown, N. Y.....	June 4, 1890
SMITH, MARION DEKALE, JR. 6 Washington Ave., Chestertown, Md...	Oct. 1, 1901
SMITH, MERRITT HAVILAND. Engr., Finance Dept., 280 Broadway, Room 52, New York City (Res., 1 Overlook Terrace, Yonkers, N. Y.).....	June 5, 1889
SNYDER, CHARLES HERMAN. Office of Structural Engr., Cambria Steel Co., 346 Locust St., Johnstown, Pa.....	Oct. 7, 1902
SPEIDEL, HUGO S. Vice-Pres. and Mgr., The David Henry Bldg. Co., cor. Main and Smith Sts., Paterson, N. J.....	Feb. 5, 1890

## JUNIORS S-W

	Date of Membership.
SPENCER, LOUIS BERNARD. Supervisor of Track, C., C. & St. L. Ry., New London, Ohio.....	Oct. 31, 1899
STARR, WILLIAM H. Supt., Chattanooga Div., Queen & Crescent R. R., Somerset, Ky.....	April 2, 1884
STEWART, JOHN HENRY. 123 West 11th St., New York City.....	Nov. 3, 1896
STEWART, WILLIAM JAMES. First Asst. City Engr., Rochester, N. Y....	May 7, 1890
STIGER, JOHN SHARP, JR. Bernardsville, N. J.....	Oct. 2, 1900
STRAWN, THOMAS CORWIN. Care, Chf. Engr., D., L. & W. R. R., Hoboken, N. J.....	Nov. 5, 1901
SWINDELLS, JOSEPH SPRINGER. Asst. Engr., New Croton Dam, 3 Jane St., Mount Kisco, N. Y.....	Feb. 2, 1897
TAPPAN, ROGER. Boston Art Club, cor. Newbury and Dartmouth Sts., Boston, Mass.....	Dec. 3, 1884
TAYLOR, ALEXANDER JENIFER. 900 Adams St., Wilmington, Del.....	Oct. 3, 1899
TAYLOR, HOWARD FLANDERS. Res. Engr., Gasconade R. R. Constr. Co., Spring Garden, Mo.....	Feb. 28, 1899
TAYLOR, WILLIAM PURVES. Engr. in Chg. of Municipal Testing Laboratories, Room 318, City Hall, Philadelphia, Pa.....	Oct. 7, 1902
THAYER, JAMES WARREN. Engr. of the Scarsdale Estates, Scarsdale, N. Y.; Office, 20 Nassau St., New York City .....	Feb. 2, 1897
THOMPSON, MACKEY J. La Crosse, Wis.....	May 1, 1894
THOMPSON, WILFORD ASHFORD. Engr. with the California Development Co., Old Beach (Res., 639 West 16th St., Los Angeles), Cal.....	Oct. 1, 1901
THOMSON, ALEXANDER, JR. Asst. Engr., New York Rapid Transit R. R. Comm., 147 Columbus Ave., New York City.....	Dec. 4, 1900
TILT, GARRET EDWARD. 688 E. 25th St., Paterson, N. J....	April 4, 1899
TOENSFELDT, HANS CARL THOMAS. Asst. Engr., with Brenneke & Fay, Cons. Engrs., St. Louis, Mo.....	April 1, 1902
TOMBO, CARL. 273 West 138th St., New York City.....	Feb. 3, 1903
TOWNE, JOSEPH MINOTT. Asst. Engr., Safety Car Heating & Lighting Co., 206 Erie St., Jersey City, N. J.....	Dec. 5, 1899
ULLMANN, JOHN GEORGE. 110 White Bldg., Buffalo, N. Y .....	April 1, 1902
UNDERWOOD, HOWARD WARREN. Asst. Engr. in Chg. of Operations of Lower Roxborough Filter Plant, Philadelphia, Pa. ....	Dec. 3, 1901
VAN BRAKLE, JOHN OGDEN. 2626 Broadway, New York City.....	Mar. 5, 1901
VAN LOAN, SETH MORTON. Asst. Engr., Belmont Filter Plant, 2525 Belmont Ave., Philadelphia, Pa.....	Dec. 28, 1900
VAN PELT, SUTTON. Junior, U. S. Engrs., Tuscaloosa, Ala .....	Mar. 6, 1900
VAN ZILE, HARRY LEE. 410 West End Ave., New York City.....	Jan. 6, 1886
VEUVE, ERLE LEROY. Asst. Engr., Pacific Elec. Ry. Co., Los Angeles, Cal.....	Sept. 3, 1901
WACHTER, CHARLES LUCAS. Third Asst. Engr., Cableway Dept., Lidgerwood Mfg. Co., 96 Liberty St., New York City.....	June 3, 1902

# JUNIORS W-Z

Date of Membership.

WARD, CHARLES ROYCE. Asst. Engr., Dept. of Highways, Brooklyn, N. Y. ....	Dec. 1, 1896
WARNER, GEORGE LITTLETON. 1522 Kingman Pl., N. W., Washington, D. C. ....	April 1, 1902
WAUGH, WILLIAM HAMMOND. Greenville, Pa. ....	Oct. 1, 1901
WEAVER, FRANK MAURICE. 1813 North 15th St., Philadelphia, Pa. ....	Nov. 4, 1902
WELLER, FRANCIS REPETTI. Insp., D. C. Engr. Dept., 408 C St., S. E., Washington, D. C. ....	Feb. 5, 1901
WELLS, CLINTON GLENCALRN. City Engr., City Hall, Galveston, Tex. . .	Mar. 5, 1901
WELTON, BENJAMIN FRANKLIN. Examining Engr., Commrs. of Accounts, 280 Broadway, New York City (Res., 1 Weiner Pl., Tompkinsville, N. Y.).....	April 6, 1897
WENIGE, ARTHUR EMIL. Asst. Engr., 2d Div., Rapid Transit R. R. Comm., 244 East 86th St., New York City.....	May 6, 1902
WHITE, FRANK GEORGE. Office of City Engr., Salt Lake City, Utah. . .	Dec. 3, 1901
WHITNEY, THOMAS BRYAN, Jr. Care, Met. St. Ry. Co., New York City.	Sept. 6, 1898
WHITSON, ABRAHAM FRANKLIN. Transitman, Topographical Bureau, Borough of Richmond, 156 East 34th St., New York City. ....	Jan. 7, 1902
WHITTED, LEVI ROMULUS. Draftsman, Dept. Yards and Docks, Navy Yard, Norfolk, Va. ....	Mar. 6, 1900
WICKERSHAM, JOHN HOUGH. 1 East 34th St., New York City. ....	May 6, 1902
WIDDICOMBE, ROBERT ALEXANDER. Engr. and Supt., Kroeschell Bros. Co., 1651 Roscoe St., Chicago, Ill. ....	April 2, 1901
WILCOCK, FREDERICK. Asst. Engr., Rapid Transit R. R. Commrs. of N. Y., 147 Columbus Ave., New York City.....	Jan. 7, 1902
WILCOX, CLARK LUZERNE. Asst. Engr., Waring, Chapman & Farquhar, Civ. Engrs., 874 Broadway, New York City. ....	Dec. 3, 1901
WILDES, WALDO GILMAN. 208 Church St., Clinton, Mass. ....	Feb. 3, 1903
WILGUS, HERBERT SEDGWICK. Allegheny Track Elev. Work, P., Ft. W. & C. R. R. (Res., 1206 Boyle St.), Allegheny, Pa. ....	Oct. 1, 1901
WILHELM, JEROME FREDERICK. Div. Engr., Mo. Pac. Ry., Care, T. Tonnesen, Carthage, Mo. ....	Jan. 2, 1900
WILLIAMS, ROGER BUTLER, Jr. Civ. and San. Engr. (Williams & Whitman), 702 Fuller Bldg., New York City.....	Oct. 1, 1901
WINCHESTER, PHILIP HAROLD. Asst. Engr., N. Y. C. & H. R. R. R., 20 Winslow St., Watertown, N. Y. ....	Jan. 7, 1902
WOOLLARD, GEORGE CLIFTON. Engr., James Stewart & Co., Hornellsville, N. Y. ....	April 3, 1900
YOUNG, HENRY AMERMAN. In Chg. of Constr. and Repairs at Fort Washington, Md., and Fort Hunt, Va., U. S. Engr.'s Office, 2001 I St., N. W., Washington, D. C. ....	Mar. 5, 1901
ZABRISKIE, AARON J. 23 Fifth Ave., New York City. ....	July 1, 1885

## FELLOWS.

[F. Am. Soc. C. E.]

	Date of Membership.
ADAMS, EDWARD DEAN. 35 Wall St., New York City.....	Mar. 31, 1891
AINSLIE, JAMES W. Care, F. H. Vaughan, 207 East College St., Louisville, Ky.....	May 28, 1872
ALBRIGHT, JOHN JOSEPH. Buffalo, N. Y.....	April 20, 1886
BARBER, AMZI LORENZO. 11 Broadway, New York City.....	Mar. 19, 1886
BELKNAP, WILLIAM RICHARDSON. 115 West Main St., Louisville, Ky..	May 28, 1872
BLATCHFORD, ELIPHALET W. 375 La Salle Ave., Chicago, Ill.....	Feb. 6, 1873
BOUTON, NATHANIEL S. Care, Kenwood Bridge Co., 614 First National Bank Bldg., Chicago, Ill.....	Dec. 30, 1872
CHANUTE, OCTAVE. ( <i>Past-President</i> ). Cons. Engr., 413 East { M. Feb. 19, 1868	
Huron St., Chicago, Ill..... { F. July 11, 1872	
CLARK, EDWARD WHITE. Bullitt Bldg., Philadelphia, Pa.....	April 8, 1870
CLEMENT, VICTOR M. Cons. Engr., 163 Brigham St., Salt Lake City, Utah.....	Jan. 8, 1890
COIT, EDWARD WOOLSEY. Local Mgr., National Tube Works Co., St. Louis, Mo.....	Sept. 20, 1872
COLEMAN, THOMAS COOPER. 252 West Main St., Louisville, Ky.....	May 28, 1872
COOPER, EDWARD. 17 Burling Slip, New York City.....	Dec. 10, 1885
DARWIN, HARRY GILBERT. Supt., Tenement House Dept. of City of New York, 61 Irving Pl., New York City....	Mar. 2, 1887
DU PONT, BIDERMAN. Louisville, Ky.....	Sept. 5, 1873
EVEREST, CHARLES MARVIN. Vice-Pres., Vacuum Oil Co., Rochester, N. Y.....	Nov. 1, 1892
FARREN, B. N. Montague City, Mass.....	Mar. 12, 1870
FLINT, CHARLES R. Flint & Co., 30 Broad St. (Res., 4 East 36th St.), New York City.....	June 7, 1876
GREEN, SAMUEL MAGEE. R. R. Contr., 41 Sentinel Bldg., Milwaukee, Wis.....	Sept. 5, 1888
GURNEE, WALTER S. 80 Broadway, New York City.....	May 10, 1870

## FELLOWS H-W

	Date of Membership.
HILL, JAMES JEROME. Pres., Great Northern Ry. Co., St. Paul, Minn.	Jan. 10, 1889
HOLMAN, STEPHEN. 150 Atlantic Ave., Swampscott, Mass.....	June 29, 1872
JONES, BENJAMIN FRANKLIN. Pittsburg, Pa.....	June 13, 1870
KIDDLE, ALFRED WATTS. 314 West 98th St., New York City.....	Oct. 3, 1893
MERRITT, GEORGE. 131 William St., New York City.....	May 6, 1870
MEYER, HENRY CODDINGTON. Montclair, N. J.....	Oct. 22, 1885
REED, WILLIAM W. 17 East 10th St., Erie, Pa..	Dec. 20, 1872
RICHMOND, HENRY A. Buffalo, N. Y.....	July 7, 1870
RUMSEY, B. C. Buffalo, N. Y.....	May 12, 1870
STANTON, JOHN ROBERT. 11 William St., New York City.....	April 4, 1899
TAYLOR, WILLIAM JOHNSTON. High Bridge, N. J.....	May 10, 1870
WALKER, GEORGE CLARKE. 228 Michigan Ave., Chicago, Ill.....	Feb. 6, 1873
WATSON, JAMES. Paterson, N. J.....	Dec. 5, 1872
WELTON, NELSON JAMES. Waterbury, Conn.....	Jan. 20, 1873

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### Fellows (not Members), 33.



## SUMMARY

### CLASSIFIED SUMMARY OF MEMBERSHIP, FEBRUARY 10th, 1903.

Honorary Members .....	9
Corresponding Members .....	2
Members .....	1 570
Associate Members.....	728
Associates.....	121
Juniors .....	262
Fellows (not Members).....	33
Total.....	2 725

# GEOGRAPHICAL LIST.

## NORTH AMERICA.

### CANADA. Total Membership, 55.

**Members.**—*Almonte, Ont.*—A. Bell. *Berlin, Ont.*—W. H. Breithaupt. *Grand Forks, B. C.*—J. H. Kennedy. *Hamilton, Ont.*—E. Fisher. *Moncton, N. B.*—P. S. Archibald, W. B. Mackenzie. *Montreal, Que.*—R. S. Buck, H. D. Bush, M. J. Butler, H. Goldmark, J. Hobson, H. Holgate, H. S. Holt, P. Johnson, J. Kennedy, E. H. McHenry, P. A. Peterson, A. W. Robinson, J. Ross, J. M. Shanly. *New Westminster, B. C.*—G. A. Keefer. *Ottawa, Ont.*—W. Crawford, S. Fleming, T. C. Keefer, J. L. P. O'Hanly. *St. Catharines, Ont.*—W. G. McN. Thompson. *Sillery, Que.*—A. A. Stuart. *Sydney, N. S.*—G. H. Duggan. *Toronto, Ont.*—W. Chipman, C. E. Goad, W. T. Jennings, E. H. Keating, C. H. Rust. *Victoria, B. C.*—H. P. Bell, F. C. Gamble, A. S. Going, E. Mohun. *Winnipeg, Man.*—H. N. Ruttan, J. G. Sullivan, W. F. Tye.

**Associate Members.**—*Fredericton, N. B.*—E. E. Brydone-Jack. *Hamilton, Ont.*—R. M. Roy. *Lachine Locks, Que.*—E. A. Rhys-Roberts. *Montreal, Que.*—C. E. Gudewill, R. E. Hunter. *New Westminster, B. C.*—H. K. Seltzer. *Niagara Falls, Ont.*—C. H. Mitchell. *Ottawa, Ont.*—S. J. Chapleau. *Peterborough, Ont.*—W. J. Francis. *Saint John, N. B.*—J. K. Scammell. *Sault Ste. Marie, Ont.*—L. H. Davis. *Vancouver, B. C.*—C. W. McMeekin.

**Associates.**—*Montreal, Que.*—T. J. Drummond, E. McG. Quirk.

**Juniors.**—*London, Ont.*—C. B. Brown, Jr.

### MEXICO. Total Membership, 36.

**Members.**—*Chihuahua.*—E. S. Safford. *Ciudad Porfirio Diaz.*—L. M. Johnson. *Colima.*—A. P. Herbert. *Culiacan.*—F. E. Butterfield. *Escalon.*—V. P. Safford. *Fuerte.*—E. A. H. Tays. *Hermosillo.*—A. F. Wrotnowski. *Mazapil.*—R. C. Gemmell. *Mexico.*—R. Adam, J. B. Body, R. E. Briggs, J. E. Earley, R. Gayol, L. Kingman, J. E. McCurdy, J. L. Phillips, A. Rosenzweig. *Monterey.*—R. Meyer, N. Turner. *Orizaba.*—S. W. Stacpoole. *Saltillo.*—S. B. Burton. *Tampico.*—A. B. Ross. *Zamora.*—H. H. Filley.

**Associate Members.**—*Chihuahua.*—F. W. Andros. *Ciudad Porfirio Diaz.*—R. Johnson. *La Cananea.*—J. P. Hallihan. *Mexico.*—S. J. Fortin, I. Mathewson, W. G. Moler. *Monterey.*—F. H. Dillon, F. T. Llewellyn. *Vera Cruz.*—J. W. Miles.

## GEOGRAPHICAL DISTRIBUTION

**Associates.**—*Mexico.*—W. W. Graham.

**Juniors.**—*Guadalajara.*—M. de la Mora. *Mapimi.*—C. F. Parker. *Mexico.*—E. Ortiz.

## UNITED STATES.

### ALABAMA. Total Membership, 22.

**Members.**—*Birmingham.*—T. H. Aldrich, J. R. Carter, G. H. Clark, J. A. Emery, H. F. Juengst, J. W. Kendrick, J. A. Montgomery. *Mobile.*—J. N. Hazlehurst. *Montgomery.*—D. M. Andrews. *Tuscaloosa.*—R. C. McCalla.

**Associate Members.**—*Birmingham.*—G. M. Braune, H. S. Jaudon, H. F. Wilson, Jr. *Kingman.*—W. S. Winn. *Mobile.*—D. G. Anderson. *Tuscaloosa.*—C. M. Ayres, L. W. Hall, O. E. Strehlow. *University.*—G. S. Wilkins.

**Juniors.**—*Birmingham.*—F. R. Berry. *Montgomery.*—W. G. Arn. *Tuscaloosa.*—S. Van Pelt.

### ARIZONA. Total Membership, 1.

**Members.**—*Prescott.*—W. A. Drake.

### ARKANSAS. Total Membership, 13.

**Members.**—*Arkansas City.*—W. D. Jenkins. *Fort Smith.*—F. W. Bond. *Harrison.*—S. F. Shaw. *Little Rock.*—F. A. Molitor. *Mansfield.*—G. E. Otis. *Pine Bluff.*—E. J. Nichols. *Stamps.*—H. DeW. Smith.

**Associate Members.**—*Fayetteville.*—J. J. Knoch. *Little Rock.*—C. J. Hogue, C. A. Slayton. *McBee Landing.*—W. G. Fox.

**Juniors.**—*Arkana.*—G. W. Corrigan. *Little Rock.*—H. G. Perring.

### CALIFORNIA. Total Membership, 81.

**Honorary Members.**—*San Francisco.*—G. Davidson, G. E. Gray.

**Members.**—*Angels Camp.*—A. S. Riffle. *Belvedere.*—J. M. Howells. *Berkeley.*—P. E. Harroun. *Cisco.*—C. W. Raymond. *Fresno.*—W. C. Ambrose. *Grass Valley.*—A. DeW. Foote. *Los Angeles.*—F. M. Bisbee, R. B. Burns, D. W. Cunningham, F. Eaton, G. B. Hazlehurst, F. D. Howell, Jr., J. B. Lippincott, F. H. Olmsted, J. H. Quinton, H. T. Richards, J. D. Schuyler, F. E. Trask, E. T. Wright. *Mare Island.*—H. R. Stanford. *National City.*—H. N. Savage. *Needles.*—E. T. Perkins. *Oakland.*—A. L. Adams, E. M. Boggs, L. J. Le Conte. *Pasadena.*—H. Breen, J. J. McVean. *Pomona.*—A. W. Wright. *Redlands.*—W. A. Nichols. *San Francisco.*—A. J. Bowie, J. H. Covode, G. L. Dillman, E. Duryea, Jr., W. R. Eckart, W. C. Edes, H. D. Gates, C. E. Grunsky, W. H. Hall, D. C. Henny, W. H. Heuer, W. Hood, J. D. Isaacs, N. B. Kellogg, M. Manson, D. E. Melliss, F. J. H. Rickon, F. Riffle, E. A. Rix, E. K. Smoot, C. H. Snyder, O. von Geldern, J. H. Wallace. *Santa Clara.*—

## GEOGRAPHICAL DISTRIBUTION

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**Associate Members.**—*Los Angeles*.—R. K. Brown, A. C. Hardison, J. C. McClure, W. S. Post, S. Storrow. *Mare Island*.—H. H. Rousseau. *Oakland*.—G. D. Stratton. *Palo Alto*.—J. C. L. Fish. *Pasadena*.—F. E. Wilcox. *Redlands*.—H. V. B. Osbourn. *San Francisco*.—R. M. Drake, E. F. Haas, J. Jacobs, N. B. Livermore, J. H. G. Wolf. *San Pedro*.—A. B. Diehr. *Stanford University*.—C. B. Wing.

**Associates.**—*Berkeley*.—A. V. Saph.

**Juniors.**—*Berkeley*.—F. F. Hall. *Los Angeles*.—E. L. Veuve. *National City*.—S. N. Cáceres. *Old Beach*.—W. A. Thompson. *San Francisco*.—S. Baker, H. De H. Connick.

### COLORADO. Total Membership, 26.

**Members.**—*Denver*.—M. Boehmer, H. W. Edwards, E. B. Ives, A. E. Kastl, H. C. Lowrie, M. H. Rogers, H. A. Sumner, W. C. Wetherill. *Edge-water*.—F. A. Calkins. *La Junta*.—C. A. Morse. *Lake City*.—W. H. Leffingwell. *Leadville*.—T. W. Jaycox. *Pueblo*.—H. R. Holbrook. *Salida*.—J. W. Deen. *Telluride*.—C. W. Gibbs, J. Herron.

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**Members.**—*Adelaide, Australia.*—A. B. Monerieff. *Brisbane, Australia.*—J. B. Henderson, A. W. Jardine, C. J. R. Williams. *Mareeba, Australia.*—A. S. Frew. *Melbourne, Australia.*—W. C. Kernot, H. C. Mais. *Perth, Australia.*—J. S. Walker. *Randwick, Australia.*—R. Watkins. *Sydney, Australia.*—P. Allan, J. W. Grimshaw, W. H. Warren.

**Associate Members.**—*Adelaide, Australia.*—H. F. Nichols. *Chelmer, Australia.*—R. D. A. Frew. *Opotiki, New Zealand.*—W. S. Charlesworth. *Sydney, Australia.*—H. L. Jones. *Woollahra, Australia.*—J. I. Haycroft.

### ADDRESS UNKNOWN. Total, 3.

**Members.**—C. McK. Craig.

**Associate Members.**—O. S. Osborn, A. C. Wheatley.

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**TOTAL MEMBERSHIP, 2725.**



# GEOGRAPHICAL DISTRIBUTION

## SUMMARY OF GEOGRAPHICAL DISTRIBUTION.

### NORTH AMERICA.

CANADA .....	55
MEXICO .....	36

### UNITED STATES.

ALABAMA .....	22
ARIZONA .....	1
ARKANSAS .....	13
CALIFORNIA .....	81
COLORADO .....	26
CONNECTICUT .....	49
DELAWARE .....	8
DISTRICT OF COLUMBIA .....	73
FLORIDA .....	7
GEORGIA .....	14
HAWAIIAN ISLANDS .....	5
IDAHO .....	5
ILLINOIS .....	130
INDIAN TERRITORY .....	2
INDIANA .....	16
IOWA .....	21
KANSAS .....	9
KENTUCKY .....	34
LOUISIANA .....	24
MAINE .....	20
MARYLAND .....	29
MASSACHUSETTS .....	170
MICHIGAN .....	56
MINNESOTA .....	38
MISSISSIPPI .....	11
MISSOURI .....	78
MONTANA .....	9
NEBRASKA .....	8
NEW HAMPSHIRE .....	8
NEW JERSEY .....	84
NEW MEXICO .....	4
NEW YORK .....	795
NORTH CAROLINA .....	8
OHIO .....	105
OKLAHOMA .....	5
OREGON .....	11
PENNSYLVANIA .....	302
RHODE ISLAND .....	29
SOUTH CAROLINA .....	11
SOUTH DAKOTA .....	1
TENNESSEE .....	29
TEXAS .....	24

*Carried forward*... 2 375 91

*Brought forward*... 2 375 91

UTAH .....	7
VERMONT .....	5
VIRGINIA .....	37
WASHINGTON .....	21
WEST VIRGINIA .....	20
WISCONSIN .....	20
WYOMING .....	3 2 188

### CENTRAL AMERICA.

COSTA RICA .....	2
NICARAGUA .....	2
SALVADOR .....	2 6

### SOUTH AMERICA.

ARGENTINE REPUBLIC .....	4
BRAZIL .....	1
CHILI .....	2
COLOMBIA .....	4
PERU .....	4 15

### WEST INDIA ISLANDS.

CUBA .....	9
PORTO RICO .....	2 11

### EUROPE.

AUSTRIA .....	2
FRANCE .....	2
GERMANY .....	3
GREAT BRITAIN .....	35
NETHERLANDS .....	1
NORWAY .....	2
RUSSIA .....	3
SPAIN .....	1
SWITZERLAND .....	1
TURKEY .....	1 51

### AFRICA.

TOTAL IN AFRICA .....	6 6
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### ASIA.

CHINA .....	7
COREA .....	1
INDIA .....	8
JAPAN .....	11
LADRONE ISLANDS .....	1
PHILIPPINE ISLANDS .....	8
STRAITS SETTLEMENTS .....	1 37

### AUSTRALASIA.

TOTAL IN AUSTRALASIA .....	17 17
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ADDRESS UNKNOWN .....	3 3
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**Total Membership, 2 725.**

# SUBSCRIBERS TO THE BUILDING FUND, 1881 to 1886.

The names of deceased subscribers to this fund, and of those whose address is unknown, have been omitted from this list, and the names of many living subscribers have, with their consent, also been omitted.

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BOSTON GAS LIGHT COMPANY.....	24 West St., Boston, Mass.
BOYD, CHARLES R.....	Wytheville, Va.
GRISWOLD, FRANK L.....	Cruz del Eje, Cordoba, Argentine Republic.
MAHER & BRAYTON.....	Cleveland, Ohio.
SORZANO, JULIO F.....	33 Broadway, New York City.
TOWLE, STEVENSON.....	220 Broadway, New York City.

# PAST AND PRESENT OFFICERS

## AND YEARS IN WHICH THEY HELD OFFICE.

The figures of the year during which office was held are, to save space, printed without those of the century. In some cases they do not show the year in which office was taken; for instance, an officer whose term extended from November, 1873, to November, 1875, appears in this table as having held office during 1874 and 1875, or 74-75.

The names of deceased members are printed in italics.

NAME.	President.	Vice-President.	Secretary.	Treasurer	Director.
<i>Adams, Julius Walker</i> .....	74-75	68-73	.....	.....	53, 76
<i>Allen, Horatio</i> .....	72-73	.....	.....	.....	.....
ARCHBALD, JAMES .....	.....	.....	.....	.....	87
<i>Becker, Max Joseph</i> .....	89	.....	.....	.....	.....
BENSEL, JOHN ANDERSON.....	.....	.....	.....	.....	99-01
BENZENBERG, GEORGE HENRY..	.....	01-02	.....	.....	95-97
BOGART, JOHN .....	.....	.....	78 90	$\left\{ \begin{array}{l} 76 \ 77 \\ 91 \ 94 \end{array} \right\}$	73-75
BOLLER, ALFRED PANCOAST....	.....	.....	70-71	.....	72
BONTECOT, DANIEL .....	.....	.....	.....	.....	96-98
BOUSCAREN, LOUIS FREDERIC	.....	.....	.....	.....	.....
GUSTAVE .....	.....	03	.....	.....	81
BRIGGS, JOSIAH ACKERMAN....	.....	.....	.....	.....	01-03
BROWNE, GEORGE HAMILTON...	.....	.....	.....	.....	95-97
<i>Brush, Charles Benjamin</i> ....	.....	92 93	.....	.....	88-91
BUCHHOLZ, CARL WALDEMAR....	.....	.....	.....	.....	99-01
BUCK, LEFFERT LEFFERTS....	.....	.....	.....	.....	92-94
BUCK, RICHARD SUTTON.....	.....	.....	.....	.....	02-03
BURR, WILLIAM HUBERT.....	.....	.....	.....	.....	94 96
CARTER, EDWARD CARLOS.....	.....	.....	.....	.....	01-03
CARTWRIGHT, ROBERT.....	.....	99-00	.....	.....	95-97
CASEY, THOMAS L.* .....	.....	.....	.....	.....	82
CHANUTE, OCTAVE .....	91	80-81	.....	.....	74-76, 85
<i>Chesbrough, Ellis Sylvester</i> ....	78	.....	.....	.....	70
CHESBROUGH, I. C.*.....	.....	.....	.....	.....	55-67
<i>Clark, Jacob Merrill</i> .....	.....	72-73	.....	.....	70-71
CLARKE, ELIOT CHANNING .....	.....	.....	.....	.....	89
<i>Clarke, Thomas Curtis</i> .....	96	71	.....	.....	79

\* Resigned.

# PAST AND PRESENT OFFICERS

NAME.	President.	Vice-President.	Secretary.	Treasurer.	Director.
COHEN, MENDES.....	92	90	.....	.....	88
COLLINGWOOD, FRANCIS....	.....	.....	91-94	.....	73-76
COOPER, THEODORE.....	.....	.....	.....	.....	84-85
<i>Copeland, Charles W.</i> .....	.....	53-69	.....	.....	.....
CORTHELL, ELMER LAWRENCE ..	.....	89, 93-94	.....	.....	.....
CRAIGHILL, WILLIAM PRICE†...	94	.....	.....	.....	92-93
CRIVEN, ALFRED.....	.....	.....	.....	.....	03
<i>Craven, Alfred Wingate</i> .....	70-71	54-67	.....	.....	{ 53, 68-69, 72-73
CROES, JOHN JAMES ROBERTSON.	01	88	.....	78-87	77
CROSBY, BENJAMIN LINCOLN ..	.....	.....	.....	.....	97-99
CROWELL, FOSTER .....	.....	.....	.....	.....	93-95
CURTIS, FAYETTE SAMUEL.....	.....	.....	.....	.....	95-97
<i>Curtis, William Giddings</i> .....	.....	.....	.....	.....	90
DAVIS, JOSEPH PHINEAS.....	.....	84	.....	.....	78, 81-83
DAVISON, GEORGE STEWART.....	.....	.....	.....	.....	03
DEYO, SOLOMON LEFEVRE.....	.....	.....	.....	.....	98-00
<i>Dresser, George Warren</i> .....	.....	.....	.....	.....	82
<i>Eads, James Buchanan</i> .....	.....	82	.....	.....	.....
<i>Ellis, Theodore Grenville</i> .....	.....	74-77	.....	.....	79
ELY, THEODORE NEWEL.....	.....	.....	.....	.....	92-93
ENDICOTT, MORDECAI THOMAS..	.....	.....	.....	.....	01-03
FANNING, JOHN THOMAS.....	.....	.....	.....	.....	93-95
<i>Fink, Albert</i> .....	80	78-79	.....	.....	.....
FITZGERALD, DESMOND.....	99	95-96	.....	.....	92-94
<i>Flad, Henry</i> .....	86	83	.....	.....	.....
FORD, JAMES K.*.....	.....	.....	.....	.....	68-69
FORNEY, MATTHIAS N.*.....	.....	.....	.....	.....	77
FORSYTH, ROBERT.....	.....	.....	.....	.....	87
<i>Francis, James Bicheno</i> .....	81	70, 79-80	.....	.....	.....
FRAZIER, JAMES LEWIS.....	.....	.....	.....	.....	02-03
FREEMAN, JOHN RIPLEY.....	.....	02-03	.....	.....	96-98
FTELEY, ALPHONSE.....	98	89-91	.....	.....	88
<i>Fuertes, Estevan Antonio</i> .....	.....	.....	.....	.....	92
<i>Gardiner, Edward</i> .....	.....	53	54	54	.....
<i>Gillmore, Quincy Adams</i> .....	.....	.....	.....	.....	76
GORSUCH, ROBERT B.*.....	.....	.....	53	53	.....
<i>Gottlieb, Abraham</i> .....	.....	.....	.....	.....	92-93
<i>Gruff, Frederic</i> .....	85	.....	.....	.....	84
GRAY, SAMUEL MERRILL.....	.....	92	.....	.....	.....
GREEN, BERNARD RICHARDSON..	.....	.....	.....	.....	94-96
<i>Green, George Sears</i> .....	76-77	.....	.....	.....	{ 68-69, 71, 73, 75, 77-79
GREENE, GEORGE SEARS, JR.....	.....	85	.....	88-90	82-84, 86

\* Resigned.

† Elected President during his term of office as Director.

# PAST AND PRESENT OFFICERS

NAME.	President.	Vice-President.	Secretary.	Treasurer.	Director.
<i>Gzowski, Sir Casimir Stanislaus.</i>					94
HAINES, HENRY STEVENS.....		01-02			97-99
HAMILTON, WILLIAM GASTON...					83, 87
HARROD, BENJAMIN MORGAN....	97	95-96			92-94
HERING, RUDOLPH.....		00-01			91, 97-99
HERMANY, CHARLES.....		91			80
HERSCHEL, CLEMENS.....					91
HILL, ALBERT BANES.....					92
<i>Holley, Alexander Lyman</i> .....		77			76
HUNT, CHARLES WARREN.....			95-03		.....
<i>Hutton, William Rich.</i> .....		96-97			84-86
JACKSON, WILLIAM.....					02-03
JOHNSON, LORENZO MEDICI.....					97-99
JOHNSON, THOMAS H.....					00-02
JUST, GEORGE ALEXANDER.....					96-98
KATTÉ, WALTER.....					85, 89
KEEFER, THOMAS COLTRIN.....	88	86-87			82
KENNEDY, JOHN.....					98-00
KENNEDY, WILLIAM HARLIN†...					02-03
<i>Kirkwood, James Pugh</i> ‡.....	68				53-67
KNAP, JOSEPH MOSS.....				00-03	94-96
KUICHLING, EMIL.....					01-03
LANDRETH, OLIN HENRY.....					93-95
<i>Laurie, James</i> .....	53-67				
LEVERICH, GABRIEL.....			72-77		
LEWIS, EUGENE CASTNER.....					03
<i>Ludlow, William</i> .....					90
<i>McAlpine, William Jarvis</i> ‡....	68-69				54-67, 70
MACDONALD, CHARLES.....		93-94			71, 74-75
MCDONALD, HUNTER.....					03
<i>MacLeod, John</i> .....		92			
McMATH, ROBERT EMMET.....					89
McNULTY, GEORGE WASHINGTON.....					92-93
McVEAN, JOHN JAY.....					98-00
MANLEY, HENRY.....					98-00
MARTIN, CHARLES CYRIL.....		94-95			
MEAD, ELWOOD.....					03
<i>Mendell, George Henry</i> .....		97-98			
<i>Merrill, William Emory</i> .....					83
METCALF, WILLIAM.....	93				83-84
MEYER, THOMAS C.§.....			69		
MOORE, ROBERT.....	02	88, 99-00			92-93
MORDECAI, AUGUSTUS.....					95-97

† Elected Director Dec. 3d, 1901, to fill the vacancy caused by the death of George A. Quinlan.

‡ Mr. Kirkwood resigned the Presidency August 5th, 1868, and Mr. McAlpine was elected for the unexpired term.

§ November 3d, 1869, to January 5th, 1870.



# PAST AND PRESENT OFFICERS

NAME.	President.	Vice-President.	Secretary.	Treasurer.	Director.
<i>Morell, W. H.</i> .....					53
MORISON, GEORGE SHATTUCK...	95				
MORRIS, HENRY GURNEY .....					86
<i>Morse, James Otis</i> .....			55-69	55-75	54-67, 77
MORSE, HENRY GRANT.....					97-99
MYERS, CHARLES HAYWARD .....					92
MYERS, EDMUND TROWBRIDGE					
DANA .....					92
NICHOLS, OTHNIEL FOSTER.....					92-93
NOBLE, ALFRED†.....	03	00-01			95
NORTH, EDWARD P.....		98-99			91
O'ROURKE, JOHN FRANCIS.....					00 02
OSBORN, FRANK CHITTENDEN..					01-03
OSGOOD, JOSEPH OTIS.....					03
OWEN, JAMES .....					97-99
PAINE, CHARLES.....	83				
<i>Paine, William H.</i> .....		82-84			77-81
PARSONS, WILLIAM BARCLAY.....					96-98
PEGRAM, GEORGE HERNDON.....					02-03
PETERSON, PETER ALEXANDER..		96-97			92 93
<i>Pope, Willard Smith</i> .....					93-95
<i>Pratt, J. W.</i> .....					54
<i>Prosser, Thomas</i> .....					70
PROUT, HENRY GOSLEE .....					93-95
<i>Quinlan, George Austin</i> .....					00-01
RAMSEY, JOSEPH, JR.....					00-02
READ, ROBERT LELAND.....					92-93
RICHARDSON, HENRY BROWN....					00-02
RICKETTS, PALMER CHAMBER-					
LAINÉ.....					99-01
<i>Roberts, William Milnor</i> .....	79	74-76, 78			77
ROWLAND, THOMAS FITCH.....		86-87,			71-73
SCHNEIDER, CHARLES CONRAD .....		02-03			87, 98-00
SCHUYLER, JAMES DIX.....		03			92, 99-01
SEAMAN, HENRY BOWMAN.....					00-02
SEE, HORACE*.....					96-98
<i>Shinn, William Powell</i> .....	90				89
<i>Sidell, W. H.</i> .....					53
<i>Smith, Charles Shaler</i> .....					78
<i>Smith, Charles Vanderhoort</i> .....					78-81
SMITH, T. GUILFORD .....					94-96
SOOYSMITH, CHARLES .....					95-97
STANTON, ROBERT BREWSTER ..					94-96

\* Resigned.

† Elected Director Nov. 5th, 1895, to fill the vacancy caused by the death of Willard S. Pope.

# PAST AND PRESENT OFFICERS

NAME.	President.	Vice-President.	Secretary.	Treasurer.	Director.
STEARNS, FREDERIC PIKE.....	.....	98-99	.....	.....	93-95
STROBEL, CHARLES LOUIS.....	.....	.....	.....	.....	86, 94
SWAIN, GEORGE FILLMORE.....	.....	.....	.....	.....	01-03
SYMONS, THOMAS WILLIAM.....	.....	.....	.....	.....	96-98
<i>Talcott, William Hubbard.....</i>	.....	.....	.....	.....	54-68
THOMSON, JOHN.....	.....	.....	.....	95-99	92-94
TOWLE, STEVENSON.....	.....	.....	.....	.....	87-88
TURNER, EDMUND KIMBALL.....	.....	.....	.....	.....	99-01
VAN BUREN, ROBERT.....	.....	.....	.....	.....	90
VAN HOESEN, EDMUND FRENCH.....	.....	.....	.....	.....	02-03
VAN HORNE, JOHN GARRET.....	.....	.....	.....	.....	92
VAN WINKLE, EDGAR BEACH.....	.....	.....	.....	.....	80
<i>Vaughan, Frederic Willis.....</i>	.....	.....	.....	.....	85
VOORHEES, THEODORE.....	.....	.....	.....	.....	90
WALLACE, JOHN FINDLEY.....	00	97-98	.....	.....	.....
WARD, JOHN FROTHINGHAM*.....	.....	.....	.....	.....	68-72
WARREN, GOUVERNEUR K.*.....	.....	.....	.....	.....	80
<i>Welch, Ashbel†.....</i>	82	81	.....	.....	.....
WHINERY, SAMUEL.....	.....	92-93	.....	.....	91, 99-01
WHITCOMB, HENRY DONALD.....	.....	.....	.....	.....	94-96
<i>White, William Howard.....</i>	.....	.....	.....	.....	86
<i>Whitman, Thomas Jefferson.....</i>	.....	85	.....	.....	.....
WHITTEMORE, DON JUAN.....	84	.....	.....	.....	81
WILGUS, WILLIAM JOHN.....	.....	.....	.....	.....	02-03
<i>Wilson, Joseph Miller.....</i>	.....	94-95	.....	.....	88
WISNER, GEORGE Y.....	.....	.....	.....	.....	98-00
WOOD, DE VOLSON*.....	.....	.....	.....	.....	74
<i>Worthington, William Ezra.....</i>	87	.....	.....	.....	72

\* Resigned.

† Mr. Welch died September 25th, 1882, during his term of office as President.

‡ Elected Director to fill the vacancy caused by the death of Abraham Gottlieb, Feb. 9th, 1894.

## DECEASED MEMBERS.

H. M., Honorary Member.	M., Member.	A. M., Associate Member.	F., Fellow.
Name.	Date of Election.	Date of Death.	Memoirs.*
ABERT, JOHN JAMES	H. M. Mar. 2, 1853.	Jan. 27, 1862.	XIX, 88
ABBOTT, JOB	M. April 1, 1891.	Aug. 18, 1896.	XXXVI, 538
ACKENHEIL, CHARLES	M. Feb. 2, 1887.	Jun. 20, 1890.	XVII, 137
ADAMS, JULIUS WALKER	{ M. Nov. 5, 1852. }	Dec. 13, 1899.	.....
	{ H. M. Oct. 26, 1888. }		
AINSLIE, GEORGE	F. May 28, 1872.	Sept. 6, 1878.	XV, 41
ALDRICH, JAMES COLWELL	M. May 7, 1873.	April 3, 1900.	XLV, 617
ALLAIRE, WILLIAM MILLER	J. Mar. 2, 1881.	Dec. 14, 1884.	XIX, 67
ALLEN, HORATIO	{ M. Dec. 4, 1867. }	Dec. 31, 1889.	XVI, 180
	{ H. M. Mar. 4, 1874. }		
ALLEN, THEODORE	M. Nov. 16, 1870.	Sept. 18, 1890.	XVII, 240
ALLEN, WILLIAM ALBERT	M. May 6, 1891.	Mar. 21, 1896.	XXXVI, 539
ALLIS, EDWARD PHELPS	F. Aug. 4, 1883.	April 1, 1889.	XV, 168
ANDERSON, ADNA	M. Sept. 2, 1874.	May 15, 1889.	XV, 166
ANSLEY, GEORGE DOANE	M. Sept. 4, 1878.	Sept. 22, 1883.	XV, 109
ARTHUR, WILLIAM YOUNG	{ M. Dec. 4, 1867. }	Feb. 15, 1876.	....
	{ F. Sept. 20, 1870. }		
ASPINWALL, WILLIAM HOWLAND	F. July 9, 1870.	Jan. 18, 1875.	XXXVI, 598
ATWOOD, WILLIAM HENRY	M. May 4, 1881.	Sept. 4, 1890.	XVII, 205
AVERY, JOHN	M. Dec. 4, 1867.	Jan. 30, 1884.	XI, 117
BACHE, ALEXANDER DALLAS	H. M. Mar. 2, 1853.	Feb. 17, 1867.	XXXVI, 522
BAILEY, THOMAS NORTON	M. Nov. 7, 1883.	April 20, 1886.	XVI, 186
BAKER, WILLIAM LATIMER	{ J. Jan. 6, 1875. }	May 28, 1888.	XV, 111
	{ M. Nov. 6, 1878. }		
BANNISTER, CHARLES KIMBALL	M. May 3, 1893.	Jan. 10, 1901.	.....
BARBOUR, WILLIAM SULLIVAN	M. April 17, 1872.	Feb. 24, 1889.	XV, 142
BARNARD, JOHN GROSS	{ M. Sept. 15, 1869. }	May 14, 1882.	XIII, 134
	{ H. M. April 7, 1873. }		
BARNES, DAVID LEONARD	M. July 2, 1890.	Dec. 15, 1896.	XLI, 618
BARNES, JAMES	M. Mar. 13, 1853.	Feb. 12, 1869.	XXXVI, 540
BARRIGER, JOHN WALKER, JR.	{ J. May 31, 1898. }	Dec. 19, 1902.	.....
	{ A. M. April 2, 1902. }		
BARTLETT, WINTHROP	M. Jan. 2, 1889.	Jan. 16, 1899.	.....

\* The italic references in this column are to the volume and page of *Transactions*, in which the Memoirs prepared after January 1st, 1896, were published; the other figures refer to the volume and page of *Proceedings*, where the Memoirs prepared earlier than that date will be found.

# DECEASED MEMBERS B C

Name.	Date of Election.	Date of Death.	Memoirs.*
BATTERSON, JAMES GOODWIN	F. June 7, 1876.	Sept. 18, 1901.	.....
BAUMANN, EDWARD	A. June 2, 1880.	Jan. 26, 1889.	XV, 114
BAYLEY, GEORGE WILLIAM READ	M. July 10, 1872.	Dec. 14, 1876.	IV, 58
BEARDSLEY, FRANK CHESTER	M. Nov. 7, 1894.	July 1, 1895.	XXI, 182
BECKER, MAX JOSEPH	M. Aug. 7, 1872.	Aug. 23, 1896.	XXXVII, 555
BEHRENS, WILLIAM FREDERIC	{ J. Nov. 6, 1889. } { A. M. June 7, 1893. }	Feb. 6, 1894.	XX, 87
BELKNAP, MORRIS SHEPPARD	M. Aug. 7, 1872.	July 19, 1890.	XVI, 167
BELL, JAMES E.	M. Mar. 5, 1879.	June 9, 1879.	V, 98
BENTLEY, HENRY ADAMSON	M. Mar. 2, 1881.	May 13, 1889.	.....
BENYAURD, WILLIAM H. H.	M. Nov. 3, 1875.	Feb. 7, 1900.	.....
BERESFORD, FRANK	J. Sept. 7, 1887.	Dec. 12, 1887.	XXXVI, 594
BISHOP, THOMAS SPARKS	M. Sept. 2, 1885.	Nov. 13, 1898.	XLI, 621
BLAKE, EDWARD JOSIAH	M. April 3, 1889.	May 29, 1902.	.....
BLICKENSERFER, JACOB	M. June 1, 1881.	Feb. 26, 1899.	.....
BLISS, HENRY ISAAC	M. Sept. 5, 1883.	July 10, 1896.	XXXVI, 541
BLUNDEN, HENRY D.	{ J. Jan. 5, 1876. } { M. Feb. 4, 1880. }	Jan. 7, 1889.	XXXVI, 542
BODDISH, SUMNER HOMER	M. Oct. 2, 1889.	May 17, 1894.	XX, 96
BOEKE, AUGUST WILLIAM	M. Sept. 3, 1890.	Oct. 24, 1894.	XX, 204
BOOKER, BERNARD FRANK	{ J. Oct. 7, 1885. } { M. June 2, 1891. }	July 21, 1894.	XX, 183
BRADBURY, HENRY ROBERT	A. July 6, 1881.	July 3, 1901.	.....
BRIDGFORD, JOHN	F. Jan. 14, 1871.	Mar. 8, 1898.	.....
BRIGGS, ALBERT DWIGHT	F. May 17, 1870.	Feb. 20, 1881.	XV, 132
BRIGGS, ROBERT	M. Oct. 19, 1870.	July 24, 1882.	XXXVI, 542
BROUGH, REDMOND JOHN	M. Sept. 1, 1880.	July 21, 1883.	XII, 40
BROWN, CHARLES IRWIN	M. Jan. 7, 1891.	Mar. 23, 1899.	.....
BROWN, JOHN MILTON	M. April 1, 1874.	June 16, 1874.	I, 170
BRUNER, DANIEL PASTORIUS	{ J. Sept. 6, 1876. } { M. May 7, 1879. }	Aug. 29, 1901.	.....
BRUSH, CHARLES BENJAMIN	{ A. Sept. 6, 1871. } { M. Sept. 5, 1877. }	June 3, 1897.	.....
BUCKHOUT, ISAAC CRAIG	M. July 15, 1872.	Sept. 27, 1874.	I, 171
BURDEN, HENRY	H. M. Mar. 2, 1853.	Jan. 19, 1871.	.....
BURR, JAMES DEWEY	M. April 5, 1876.	May 5, 1886.	XII, 107
BUTTS, ELIJAH POLHILL	J. Nov. 3, 1886.	Jan. 11, 1892.	XVIII, 129
CAMP, JONATHAN, JR.	M. Dec. 31, 1873.	April 16, 1874.	I, 186
CAMPBELL, ALLAN	{ M. Feb. 19, 1868. } { H. M. Mar. 1, 1892. }	Mar. 18, 1894.	XX, 179
CAMPBELL, CHARLES EDWARD HENRY	M. Oct. 3, 1883.	Dec. 6, 1902.	.....
CARD, JOSEPH P.	A. Sept. 5, 1883.	Oct. 22, 1894.	XXI, 68
CARPENTER, CLARENCE ALLAN	M. May 2, 1888.	Nov. 9, 1899.	.....
CARREL, FREDERICK JANVRIN	M. Mar. 5, 1884.	May 2, 1894.	XXXVII, 559

\*The italic references in this column are to the volume and page of *Transactions*, in which the Memoirs prepared after January 1st, 1896, were published; the other figures refer to the volume and page of *Proceedings*, where the Memoirs prepared earlier than that date will be found.

# DECEASED MEMBERS C-D

Name.	Date of Election.	Date of Death.	Memoirs.*
CARTWRIGHT, HENRY	M. Sept. 6, 1876.	June 30, 1881.	VII, 124
CARY, EDGAR SHELDON	M. Nov. 1, 1882.	Jan. 5, 1883.	<i>XLVI, 555</i>
CASS, GEORGE WASHINGTON, Jr.	F. Mar. 30, 1871.	Mar. 21, 1888.	<i>XXXVI, 599</i>
CHASE, SAMUEL STEWART	{ M. Dec. 8, 1868. } { F. Mar. 12, 1870. }	May 29, 1873.	I, 40
CHENEY, NATHANIEL	F. June 21, 1870.	June 29, 1901.	.....
CHESBROUGH, ELLIS SYLVESTER	M. June 17, 1868.	Aug. 18, 1886.	XV, 160
CISNEROS, FRANCISCO JAVIER	M. May 15, 1872.	July 7, 1898.	<i>XLI, 622</i>
CLAPP, LORENZO RUSSELL	M. Feb. 1, 1888.	Aug. 13, 1902.	<i>XLIX, 341</i>
CLARK, IRA EDGAR	J. Feb. 6, 1878.	May 23, 1882.	VIII, 92
CLARK, JACOB MERRILL	M. Jan. 29, 1868.	Dec. 21, 1894.	XX, 203
CLARKE, HENRY WADSWORTH	M. Mar. 15, 1871.	Feb. 23, 1892.	XVIII, 93
CLARKE, THOMAS CURTIS	{ M. Mar. 18, 1868. } { F. May 20, 1872. }	June 15, 1901.	.....
CLEEMANN, THOMAS MUTTER	M. Oct. 1, 1879.	Nov. 16, 1893.	XX, 69
CLEMENS, ERNEST VICTOR	M. Mar. 1, 1893.	Sept. 3, 1893.	XX, 161
CLEVERDON, HENRY LAWRENCE	A. M. Mar. 1, 1899.	Aug. 27, 1902.	.....
COBB, ROBERT LINAH	M. Jan. 2, 1890.	June 2, 1895.	<i>XXXVI, 545</i>
COCHRAN, A. P.	F. June 19, 1872.	April 26, 1886.	.....
COLBURN, WARREN	M. Mar. 18, 1868.	Sept. 15, 1879.	VI, 4
COLBURN, ZERAH	M. Jan. 5, 1855.	April 26, 1870.	<i>XXXVI, 546</i>
COLBY, CHARLES LEWIS	F. July 31, 1883.	Feb. 26, 1896.	.....
COLMAN, ISAAC D.	M. Feb. 27, 1869.	April 7, 1875.	I, 331
CONNOR, ADDISON	M. Jan. 5, 1887.	Jan. 4, 1891.	<i>XXXVI, 551</i>
CONRO, ALBERT	F. June 13, 1883.	Jan. 10, 1901.	.....
COOKE, ROBERT LATIMER	M. April 17, 1872.	Aug. 11, 1877.	IV, 66
COPPÉE, HENRY ST. LEGER	M. Oct. 5, 1887.	May 8, 1901.	.....
CORREA, EDWARD ARNOLD	M. Mar. 7, 1900.	June 24, 1900.	<i>XLV, 621</i>
CORYELL, MARTIN	M. Dec. 4, 1867.	Nov. 30, 1886.	XV, 133
COURTWRIGHT, MILTON	F. June 11, 1870.	April 25, 1883.	.....
COXE, ECKLEY BRINTON	M. Feb. 7, 1877.	May 13, 1895.	<i>XXXVI, 552</i>
CRABB, THOMAS	J. Apr. 4, 1899.	Dec. 21, 1901.	.....
Craven, ALFRED WINGATE	M. Nov. 5, 1852.	Mar. 27, 1879.	VI, 24
Craven, HENRY SMITH	M. Dec. 3, 1884.	Dec. 7, 1889.	XVI, 217
CUNNINGHAM, PAUL DAVIS	A. M. Mar. 1, 1899.	July 13, 1901.	.....
CURTIS, WENDELL RHODES	{ J. Mar. 3, 1875. } { M. June 4, 1884. }	Mar. 7, 1893.	XX, 86
CURTIS, WILLIAM GIDDINGS	M. May 3, 1882.	June 15, 1900.	<i>XLV, 624</i>
CUSHING, OLIVER E.	M. July 10, 1872.	Jan. 17, 1890.	XVI, 166
CUSHING, SAMUEL BARRETT	M. Sept. 2, 1869.	July 17, 1873.	I, 43
CUSHING, SAMUEL BARRETT	M. June 1, 1887.	Dec. 2, 1888.	<i>XLIX, 343</i>
DAGRON, JAMES GUSTAVUS	M. Oct. 6, 1886.	May 25, 1895.	.....
DAVIDSON, MATTHIAS OLIVER	M. April 6, 1853.	Sept. 1, 1872.	XIX, 56
DAVIS, FRANK PAUL	M. Feb. 1, 1888.	May 3, 1900.	.....

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# DECEASED MEMBERS D-F

Name.	Date of Election.	Date of Death.	Memoirs.*
DAVIS, JOHN WOODBRIDGE	A. June 3, 1885.	Nov. 7, 1902.	<i>XLIX, 370</i>
DEARBORN, WILLIAM LEE	M. Jan. 29, 1868.	Mar. 15, 1875.	I, 330
DECOURCY, BOLTON WALLER	M. Nov. 6, 1889.	April 1, 1900.	.....
DEGARAY, FRANCISCO	F. Aug. 31, 1883.	Sept. 2, 1896.	.....
DEL MONTE, EMILIO	M. Dec. 4, 1895.	Mar. 20, 1902.	.....
DERBISHIRE, JAMES STEWART	M. April 2, 1884.	Jan. 2, 1887.	XIII, 66
DEXTER, GEORGE M.	M. Dec. 3, 1852.	Nov. 26, 1872.	I, 40
DICKINSON, GEORGE CODWISE	M. Feb. 5, 1890.	Jan. 24, 1892.	XVIII, 71
DICKINSON, POMEROY P.	M. Jan. 17, 1872.	Oct. 4, 1895.	<i>XLIII, 611</i>
DILLON, SIDNEY	F. Mar. 26, 1870.	June 9, 1892.	<i>XXXVI, 603</i>
DIRKS, JUSTUS	H. M. June 2, 1880.	Dec. 26, 1886.	XIII, 45
DIVEN, ALEXANDER SAMUEL	F. June 16, 1870.	June 11, 1896.	<i>XXXVII, 571</i>
DOANE, THOMAS	M. June 7, 1882.	Oct. 22, 1897.	<i>XXXIX, 690</i>
DORAN, FRANK C.	M. Sept. 5, 1883.	Oct. 15, 1898.	.....
DORSEY, EDWARD BATES	M. June 4, 1879.	†	.....
DOWNES, STANCLIFF BAZEN	J. April 7, 1886.	April 21, 1895.	XXI, 105
DRESSER, GEORGE WARREN	M. July 5, 1876.	May 27, 1883.	XIX, 110
DUANE, JAMES	M. Mar. 2, 1892.	Jan. 12, 1899.	.....
DUANE, JAMES CHATHAM	H. M. Nov. 20, 1886.	Nov. 8, 1897.	<i>XXXIX, 686</i>
DU BARRY, JOSEPH NAPOLEON	M. Jan. 6, 1875.	Dec. 17, 1892.	XIX, 108
DURANT, THOMAS C.	F. Nov. 18, 1870.	Oct. 5, 1885.	<i>XXXVI, 602</i>
EADS, JAMES BUCHANAN	{ M. Dec. 16, 1868. } { F. Mar. 30, 1870. }	Mar. 8, 1887.	XIII, 46
EATON, HORACE LAFAYETTE	M. Feb. 1, 1893.	Nov. 23, 1895.	<i>XXXVI, 554</i>
EAYRS, NORMAN WILDER	M. June 3, 1885.	May 13, 1900.	.....
EDGE, GEORGE WASHINGTON	M. Mar. 4, 1874.	Jan. 1, 1880.	VI, 18
ELLIOTT, GEORGE HARFORD	M. April 4, 1883.	Oct. 7, 1886.	XV, 110
ELLIS, NATHANIEL WEBSTER	M. Feb. 2, 1881.	Jan. 16, 1889.	XV, 112
ELLIS, THEODORE GRENVILLE	{ M. Feb. 17, 1869. } { F. Nov. 21, 1872. }	Jan. 9, 1883.	<i>XXXVII, 557</i>
ELLSWORTH, ALFRED BURNHAM	J. May 1, 1889.	Jan. 10, 1893.	XIX, 48
ELY, GEORGE HERVEY	A. May 31, 1892.	Jan. 24, 1894.	.....
EMACK, CHARLES S.	M. July 6, 1870.	July 26, 1877.	IV, 65
EMERSON, GEORGE DANA	M. Sept. 18, 1872.	Sept. 26, 1900.	.....
EMERY, CHARLES EDWARD	M. May 6, 1874.	June 1, 1898.	<i>XLII, 558</i>
EMMET, THOMAS ADDIS	M. Nov. 5, 1852.	Jan. 12, 1880.	VI, 2
EMONTS, WILLIAM ALEXIS GEORGE	J. Sept. 6, 1876.	Nov. 5, 1887.	<i>XXXVI, 594</i>
ENSIGN, ELISHA WILLIAMS	F. May 18, 1870.	Oct. 1, 1877.	.....
ERICSSON, JOHN	H. M. Oct. 2, 1879.	Mar. 8, 1889.	.....
EVANS, ANTHONY WALTON WHITE	{ M. Dec. 4, 1867. } { F. Mar. 15, 1870. }	Nov. 28, 1886.	XIII, 30
EVANS, LOUIS PROVOST	M. Sept. 3, 1884.	Aug. 19, 1896.	.....
FALCONNET, EUGENE F.	M. June 3, 1874.	Oct. 14, 1887.	XV, 135

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† Date of death unknown.

# DECEASED MEMBERS F-G

Name.	Date of Election.	Date of Death.	Memoirs.*
FARGO, WILLIAM G.	F. May 6, 1870.	Aug. 4, 1881.	.....
FARNAM, HENRY	F. Nov. 14, 1872.	Oct. 4, 1883.	XXXVI, 605
FARQUHAR, FRANCIS ULRIC	M. July 10, 1872.	July 3, 1883.	XV, 165
FAVA, FRANCIS RENATUS, Jr.	M. Nov. 5, 1890.	Mar. 27, 1896.	.....
FEIND, ANTHONY ERNESTE BERNHARD	M. Jan. 2, 1890.	Aug. 21, 1894.	XX, 182
FELTON, SAMUEL MORSE	F. Mar. 23, 1870.	Jan. 24, 1889.	XIX, 92
FIELD, BURR KELLOGG	M. Oct. 1, 1884.	Jan. 13, 1898.	XL, 568
FINK, ALBERT	{ M. July 20, 1870. } { F. Sept. 3, 1872. }	{ April 3, 1897. }	XXI, 626
FISHER, CHARLES HENRY	M. June 7, 1869.	Jan. 18, 1888.	XIX, 66
FLAD, HENRY	M. Feb. 15, 1871.	June 20, 1898.	XLII, 561
FLINT, EDWARD AUSTIN	M. May 18, 1870.	Jan. 23, 1886.	XII, 114
FLYNN, PATRICK JOHN	M. Feb. 4, 1891.	June 1, 1893.	XX, 68
FOGG, CHARLES E.	M. Oct. 16, 1872.	April 26, 1891.	XVII, 230
FORD, ARTHUR LIVERMORE	A. Nov. 6, 1872.	May 30, 1880.	VI, 75
FORSHEY, CALEB GOLDSMITH	M. Aug. 7, 1872.	July 25, 1881.	XXXVII, 560
FOWLER, CHARLES EDWARD	M. May 3, 1876.	Jan. 28, 1883.	XV, 164
FRANCIS, JAMES	M. Jan. 4, 1893.	Dec. 1, 1898.	XLV, 627
FRANCIS, JAMES BICHENO	{ M. Nov. 5, 1852. } { F. May 4, 1870. } { H. M. April 5, 1892. }	{ Sept. 18, 1892. }	XIX, 74
FREEMAN, ERNEST GREY	{ A. M. May 3, 1893. } { M. Oct. 5, 1898. }	{ Mar. 6, 1900. }	.....
FRENCH, EDMUND	M. Nov. 26, 1852.	July 7, 1860.	XXXVII, 561
FROST, BENJAMIN DIX	M. Feb. 21, 1872.	July 19, 1880.	XIII, 139
FUERTES, ESTEVAN ANTONIO	M. Feb. 17, 1869.	Jan. 16, 1903.	.....
GARDINER, EDWARD	M. Nov. 5, 1852.	†	.....
GARDNER, HENRY A.	M. Dec. 13, 1852.	July 26, 1875.	I, 335
GARFIAS, IGNACIO	M. Oct. 5, 1892.	Jan. 16, 1898.	.....
GELETTE, WILLIAM DUFFREE	M. April 1, 1885.	April 27, 1902.	.....
GIBLIN, ARTHUR LEON	J. Jan. 31, 1893.	July 17, 1894.	XX, 171
GILLESPIE, JOSHUA LATHROP	{ J. Feb. 3, 1875. } { M. April 2, 1884. }	{ Aug. 22, 1890. }	XVI, 224
GILLHAM, ROBERT	M. June 2, 1886.	May 19, 1899.	XLIII, 613
GILLISS, JOHN ROBERTS	{ M. June 2, 1869. } { F. Mar. 15, 1870. }	{ July 15, 1870. }	XXXVI, 555
GILLMORE, QUINCY ADAMS	M. Dec. 2, 1868.	April 7, 1888.	XX, 60
GILMAN, CHARLES CARROLL	F. May 11, 1871.	July 31, 1899.	.....
GOLAY, PHILIP	M. Sept. 5, 1877.	Oct. 31, 1898.	.....
GOODWIN, HOMER STANLEY	M. July 20, 1870.	Oct. 25, 1892.	XIX, 163
GOODWIN, JOHN MARSTON	M. Sept. 4, 1872.	Oct. 21, 1891.	XVII, 267
GORRINGE, HENRY H.	A. April 6, 1881.	July 6, 1885.	XVI, 215
GOTTLIEB, ABRAHAM	M. Sept. 4, 1872.	Feb. 9, 1894.	XX, 76

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† Date of death unknown.

# DECEASED MEMBERS G H

Name.	Date of Election.	Date of Death.	Memoirs.*
GRAFF, FREDERIC	M. May 7, 1873.	Mar. 30, 1890.	XVII, 247
GRANT, WILLIAM HARRISON	M. July 2, 1873.	Oct. 12, 1896.	XXXVI, 557
GRAIN, WILLIAM	M. Sept. 15, 1869.	Jan. 10, 1877.	.....
GRASSAU, H.	M. July 6, 1853.	May 16, 1870.	.....
GREENE, BENJAMIN H.	M. May 1, 1878.	Jan. 4, 1890.	XVI, 187
GREENE, GEORGE SEARS	M. Nov. 5, 1852.	{ Jan. 28, 1899.	XLIX, 335
	{ H. M. Oct. 26, 1888.		
GREENWOOD, WILLIAM HENRY	M. Mar. 3, 1880.	Aug. 29, 1880.	VII, 89
GRIDLEY, VERNON HILL	J. Feb. 4, 1896.	Sept. 17, 1896.	XXXVI, 595
GRIFFEN, JOHN	M. April 15, 1868.	Jan. 14, 1884.	XII, 38
GZOWSKI, Sir CASIMIR STANISLAUS	M. Dec. 2, 1868.	Aug. 24, 1898.	XLII, 567
HADDOCK, ARBA READ	A. May 4, 1881.	Feb. 28, 1885.	XIX, 67
HALL, GEORGE THOMAS	{ A. Oct. 2, 1872.	{ June 2, 1881.	VII, 97
	{ M. Sept. 2, 1874.		
HAMLIN, CHARLES EDWARD	A. Jan. 2, 1894.	Jan. 20, 1902.	.....
HANNAFORD, EDMUND PHILLIPS	M. Sept. 18, 1872.	Aug. 19, 1902.	.....
HARBAUGH, SPRINGER	F. May 19, 1871.	Dec. 8, 1887.	XV, 46
HARDEE, THOMAS SYDENHAM	M. April 4, 1877.	May 20, 1880.	XII, 66
HARDING, HORACE	M. Nov. 2, 1892.	July 29, 1899.	XLIII, 618
HARRIS, HENRIQUE	M. Dec. 3, 1873.	Oct. 10, 1882.	XXXVII, 562
HARRIS, ROBERT LEWIS	M. May 3, 1876.	Sept. 29, 1896.	.....
HARRISON, STEPHEN A.	F. Jan. 30, 1873.	June 6, 1898.	.....
HARROD, THOMAS	J. Dec. 3, 1891.	Dec. 31, 1896.	.....
HASELL, BENTLEY DOUGLAS	M. July 3, 1878.	May 29, 1900.	.....
HASKELL, CHARLES FREDERIC BEALS	M. Oct. 7, 1891.	May 20, 1895.	XXI, 181
HASLETT, SULLIVAN	M. June 4, 1879.	Jan. 4, 1887.	XIII, 127
HATFIELD, ROBERT G.	M. Dec. 4, 1867.	Feb. 15, 1879.	XXXVI, 558
HAWKSHAW, Sir JOHN	H. M. Nov. 3, 1880.	June 2, 1891.	XVII, 250
HAYWARD, JAMES A.	M. Sept. 5, 1877.	Aug. 13, 1880.	VII, 88
HEGEMAN, ALLEN BOGARDUS	M. Feb. 1, 1888.	Oct. 22, 1892.	XIX, 171
HILDRETH, RUSSELL WADSWORTH	J. Jan. 4, 1888.	Dec. 23, 1895.	XXXVI, 596
HILGARD, JULIUS ERASMUS	M. July 10, 1872.	May 8, 1891.	XVIII, 189
HILLMAN, CHARLES LA FLETCHER	M. July 5, 1876.	June 14, 1902.	XLIX, 345
HISLOP, JOHN	M. May 1, 1895.	Feb. 22, 1901.	.....
HJORTSBERG, MAXIMILIAN	M. July 10, 1872.	May 16, 1880.	VIII, 118
HOBBS, ARTHUR STANLEY	M. June 6, 1894.	May 28, 1902.	XLIX, 347
HOE, RICHARD MARCH	M. Oct. 1, 1873.	June 8, 1886.	XVI, 170
HOLLEY, ALEXANDER LYMAN	M. Oct. 1, 1873.	Jan. 29, 1882.	XVI, 212
HOUSTON, JOHN	M. May 6, 1868.	Aug. 30, 1896.	XXXIX, 694
HOVE, MILTON GROSVENOR	M. Oct. 16, 1872.	June 19, 1902.	XLIX, 349
HOWELL, CHARLES W.	M. Mar. 3, 1875.	April 5, 1882.	VIII, 121
HOWELL, GEORGE WASHINGTON	M. May 2, 1888.	Feb. 15, 1901.	XLIX, 351
HOWLAND, GEORGE, Jr.	F. June 6, 1870.	Feb. 18, 1892.	XX, 154
HUMPHREY, WILLIAM SHELDON	A. M. Sept. 2, 1891.	April 18, 1895.	XXI, 98

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# DECEASED MEMBERS H-L

Name.	Date of Election.	Date of Death.	Memoirs.*
HUMPHREYS, ANDREW ATKINSON	H. M. May 7, 1873.	Dec. 27, 1883.	XVI, 218
HUNT, ALFRED EPHRAIM	M. Sept. 1, 1886.	April 26, 1899.	<i>XLVI, 557</i>
HUNT, RANDELL	M. May 2, 1883.	Jan. 24, 1898.	<i>XLV, 629</i>
HUNTINGTON, COLLIS POTTER	F. Mar. 10, 1877.	Aug. 13, 1900.	.....
HUTTON, WILLIAM RICH	M. Jan. 8, 1873.	Dec. 11, 1901.	.....
HYDE, WILLIAM B.	M. July 12, 1877.	June 8, 1882.	XVI, 172
JAMES, JOHN COLLINSON	M. Mar. 1, 1876.	Feb. 27, 1883.	XVI, 164
JENNINGS, HENRY CLAY	M. April 6, 1887.	Mar. 13, 1894.	XX, 88
JERVIS, JOHN BLOOMFIELD	M. Dec. 4, 1867.		
	H. M. Dec. 2, 1868.	Jan. 12, 1885.	XI, 109
	F. Mar. 19, 1880.		
JEWETT, WILLIAM BRADFORD	J. June 4, 1891.	Nov. 7, 1894.	XX, 202
JOHNSON, ARCHIBALD	M. April 6, 1898.	Oct. 3, 1899.	.....
JOHNSON, CHARLES ROBERTS	M. June 3, 1885.	Sept. 11, 1893.	XX, 45
JOHNSON, JOHN BUTLER	M. April 7, 1886.	June 23, 1902.	.....
JOHNSON, T. MARR	M. Feb. 26, 1872.	July 31, 1874.	I, 171
JOHNSTON, ANDREW LANGSTAFF	M. June 4, 1890.	May 15, 1901.	.....
JORDAN, GABRIEL	M. Sept. 18, 1872.	Nov. 10, 1884.	XVI, 184
JOY, JAMES FREDERIC	F. Nov. 6, 1872.	Sept. 24, 1896.	<i>XXXVII, 575</i>
JUDAH, THEODORE DEHONE	M. May 4, 1853.	Nov. 2, 1863.	<i>XXXVIII, 448</i>
KEEFER, SAMUEL	M. Jan. 6, 1869.	Jan. 9, 1890.	XVI, 220
KILLEBREW, SAMUEL	M. Sept. 2, 1885.	Jan. 9, 1899.	<i>XXI, 639</i>
KINGSLEY, WILLIAM C.	F. June 6, 1870.	Feb. 21, 1885.	<i>XXXVI, 612</i>
KIRKWOOD, JAMES PUGH	M. Nov. 5, 1852.	April 22, 1877.	IV, 60
KLOMAN, ANDREW	F. Jan. 27, 1875.	Dec. 19, 1880.	VII, 122
KNIGHT, WILLIAM BAKER	J. Jan. 6, 1875.	Dec. 7, 1890.	XVII, 277
	M. Jan. 7, 1880.		
KRUPP, ALFRED	F. June 14, 1870.	July 14, 1887.	<i>XXXVI, 609</i>
LANE, MOSES	M. Dec. 4, 1867.	Jan. 25, 1882.	XIX, 58, 101
LASSIG, MORITZ	M. April 2, 1884.	Jan. 7, 1902.	<i>XLIX, 353</i>
LATIMER, CHARLES	M. April 5, 1876.	Mar. 25, 1888.	XV, 137
LATROBE, CHARLES HAZLEHURST	M. Nov. 16, 1870.	Sept. 19, 1902.	.....
LAURIE, JAMES	M. Nov. 5, 1852.	Mar. 16, 1875.	<i>XXXVII, 553</i>
LAWLER, JOHN	F. April 28, 1883.	Feb. 23, 1891.	.....
LAWSON, WILLIAM BATEMAN	M. Feb. 1, 1893.	Jan. 27, 1901.	<i>XLVI, 560</i>
LAWTON, FREDERICK BEECHER	J. Nov. 5, 1891.		
	A. M. Nov. 4, 1896.	Oct. 13, 1897.	.....
LEERS, FRANK ADOLPH	M. May 4, 1887.	May 19, 1890.	XX, 85
LESAGE, LOUIS	M. Sept. 7, 1881.	Jan. 9, 1889.	XVI, 96
LEUTZÉ, TREVOR MCCLURG	M. Feb. 3, 1897.	Oct. 14, 1901.	.....
LEWIS, ISAIAH WILLIAM PENN	M. Jan. 5, 1853.	Oct. 18, 1856.	<i>XXXVIII, 453</i>
LEWIS, JAMES FREDERICK	A. Feb. 6, 1889.	July 23, 1901.	.....
LINCOLN, WILLIAM SHATTUCK	M. Dec. 5, 1883.	May 16, 1902.	.....

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# DECEASED MEMBERS L M

Name.	Date of Election.	Date of Death.	Memoirs.*
LANDENTHAL, DOMINIK	A. M. Mar. 4, 1896.	June 7, 1900.	<i>XLV, 637</i>
LOCKE, AUGUSTUS WOODBURY	M. June 7, 1882.	May 14, 1893.	XIX, 172
LOCKWOOD, JOHN	A. April 5, 1882.	Dec. 9, 1891.	XVIII, 192
LONG, DENNIS	F. Mar. 28, 1872.	Oct. 8, 1893.	.....
LOTZ, WILLIAM HERMAN	M. Sept. 1, 1875.	Jan. 31, 1894.	XX, 74
LOVECRAFT, FREDERICK AARON	F. Nov. 1, 1892.	Oct. 26, 1893.	.....
LOVETT, THOMAS DAVIS	M. May 3, 1871.	Dec. 5, 1897.	<i>XL, 571</i>
LOWE, GORHAM PARSONS	M. April 21, 1869.	Jan. 8, 1894.	XX, 72
LOWTHORP, FRANCIS C.	{ M. April 1, 1868. } { F. Mar. 17, 1870. }	June 1, 1890.	XX, 196
LUDLOW, WILLIAM	M. July 5, 1882.	Aug. 30, 1901.	.....
LYON, WILLIAM M.	F. Mar. 23, 1870.	July 3, 1889.	XVI, 112
LYTE, FRANCIS ASBURY	A. M. Oct. 5, 1892.	June 24, 1896.	<i>XXXVIII, 461</i>
MACLEOD, JOHN	M. July 10, 1872.	Jan. 21, 1900.	.....
MACY, ARTHUR	{ J. July 12, 1877. } { M. Dec. 2, 1885. }	April 14, 1891.	<i>XXXVII, 562</i>
MCALPINE, CHARLES LEGRAND	M. Dec. 4, 1867.	Jan. 11, 1884.	<i>XXXVII, 563</i>
MCALPINE, WILLIAM JARVIS	{ M. Feb. 3, 1853. } { H. M. Oct. 26, 1888. }	Feb. 16, 1890.	XVIII, 115
McKEAN, REGINALD	A. M. May 2, 1894.	Oct. 15, 1901.	<i>XLIX, 366</i>
McNAIE, THOMAS SIFER	M. July 2, 1873.	July 25, 1901.	.....
MAHAN, DENNIS HART	H. M. Mar. 2, 1853.	Sept. 16, 1871.	XIX, 161
MALÉZIEUX, EMILE	H. M. Nov. 3, 1880.	May 20, 1885.	<i>XXXVI, 524</i>
MANN, GEORGE EDWARD	M. Sept. 3, 1884.	Oct. 2, 1897.	.....
MARSHALL, CHARLES ALFRED	M. Oct. 1, 1884.	May 31, 1889.	XVI, 99
MARSLAND, EDWARD	M. Feb. 6, 1878.	June 25, 1898.	....
MARTIN, ROBERT KIRKWOOD	M. June 1, 1892.	Nov. 24, 1893.	XX, 43
MASON, EDDY D.	{ M. July 19, 1872 } { F. Dec. 28, 1872. }	Dec. 19, 1874.	I, 329
MENDELL, GEORGE HENRY	M. Sept. 6, 1876.	Oct. 19, 1902.	.....
MERCUR, FREDERICK	M. July 20, 1870.	Jan. 17, 1888.	XVII, 157
MERIWETHER, NILES	M. Nov. 1, 1871.	Dec. 28, 1900.	<i>XLV, 632</i>
MERRILL, WILLIAM EMERY	M. Oct. 6, 1872.	Dec. 14, 1891.	XVIII, 90
MERZ, FREDERICK W.	F. May 28, 1872.	Dec. 8, 1883.	<i>XXXVI, 615</i>
MICHAELIS, OTHO ERNEST	M. May 6, 1874.	May 1, 1890.	XVII, 132
MICHIE, WILLIAM ROBERTS	{ J. Feb. 28, 1893. } { A. M. Oct. 7, 1896. }	Feb. 2, 1899.	<i>XLII, 345</i>
MILLER, SAMUEL H.	M. Sept. 6, 1882.	Mar. 18, 1891.	XVII, 208
MILLER, SILVANUS, Jr.	M. Mar. 2, 1887.	Dec. 17, 1897.	<i>XXXIX, 696</i>
MILLS, JAMES ELLISON	M. Feb. 3, 1886.	July 25, 1901.	.....
MILNE, PETER	A. Jan. 7, 1896.	June 9, 1902.	.....
MINTURN, ROWLAND ROBINSON	M. Nov. 2, 1887.	April 7, 1898.	.....
MITCHELL, ALEXANDER	F. June 13, 1883.	April 19, 1887.	XIII, 98
MITCHELL, HENRY	M. Jan. 7, 1880.	Dec. 1, 1902.	.....

\* The italic references in this column are to the volume and page of *Transactions*, in which the Memoirs prepared after January 1st, 1896, were published: the other figures refer to the volume and page of *Proceedings*, where the Memoirs prepared earlier than that date will be found.



# DECEASED MEMBERS M-P

Name.	Date of Election.	Date of Death.	Memoirs.*
MOFFET, JAMES DAVID	{ A. M. Nov. 4, 1891. M. Feb. 7, 1894. }	Nov. 3, 1899.	.....
MONROE, JOHN ALBERT	M. Sept. 4, 1869.	June 11, 1891.	XIX, 148
MORLEY, JAMES HENRY	M. Oct. 6, 1886.	Sept. 8, 1889.	XVI, 110
MORLEY, WILLIAM RAYMOND	M. Sept. 6, 1882.	Jan. 3, 1883.	IX, 121
MORRELL, WILLIAM H.	M. Nov. 5, 1852.	†	.....
MORRIS, GOUVERNEUR	M. Oct. 3, 1888.	Dec. 30, 1897.	<i>XXXIX, 698</i>
MORRIS, ROBERT CAMPBELL	M. Jan. 7, 1874.	Nov. 8, 1892.	XVIII, 220
MORRIS, WILLIAM W.	M. Jan. 5, 1853.	†	.....
MORSE, JAMES OTIS	M. Feb. 9, 1853.	Mar. 8, 1883.	XIX, 47
MORTON, JOHN HENRY	M. June 3, 1891.	Feb. 8, 1892.	XVIII, 105
MURDOCH, GILBERT	M. Sept. 7, 1881.	May 28, 1894.	XX, 152
NEILSON, ROBERT	M. Feb. 17, 1869.	Oct. 12, 1896.	<i>XXXVII, 564</i>
NEWELL, JOHN	M. Jan. 29, 1868.	Aug. 26, 1894.	XX, 172
NEWHAM, CHARLES EDWARD	M. Dec. 7, 1887.	Feb. 1, 1898.	.....
NEWTON, ISAAC	M. Mar. 3, 1880.	Sept. 25, 1884.	XI, 128
NEWTON, JOHN	H. M. April 30, 1884.	May 1, 1895.	.....
NICHOLS, NORMAN JAMES	M. Dec. 5, 1888.	April 8, 1896.	<i>XXXVI, 559</i>
NICKERSON, LOUIS H.	M. Sept. 18, 1872.	May 6, 1877.	.....
NORMAN, GEORGE H.	{ M. Feb. 17, 1869. F. Mar. 23, 1870. }	Feb. 4, 1900.	.....
NORTON, FREDERICK OAKFORD	F. June 4, 1879.	Sept. 27, 1892.	XVIII, 219
NOURSE, EDWIN GREEN	M. Sept. 3, 1884.	Dec. 8, 1897.	<i>XXXIX, 699</i>
NOYES, ALBERT FRANKLIN	M. Dec. 3, 1884.	Oct. 12, 1896.	<i>XXXVI, 560</i>
OGDEN, WILLIAM B.	F. Mar. 23, 1870.	Aug. 3, 1877.	IV, 67
O'MELVENY, JOHN CHARLES	M. May 4, 1898.	Oct. 3, 1899.	.....
O'SULLIVAN, THOMAS S.	M. Jan. 5, 1853.	Nov. 1, 1855.	.....
PADDOCK, JOSEPH HILL	M. Oct. 5, 1892.	April 4, 1894.	XX, 89
PAINE, WILLIAM H.	M. May 12, 1875.	Dec. 31, 1890.	XVII, 160
PARKER, CHARLES FRANCIS	J. Mar. 5, 1890.	Oct. 10, 1898.	.....
PENNYPACKER, LEVIS PASSMORE	A. M. April 1, 1891.	Jan. 30, 1901.	<i>XLVI, 570</i>
PETRY, ALFRED	M. Oct. 6, 1886.	May 14, 1901.	.....
PHILBRICK, EDWARD SOUTHWICK	M. May 6, 1874.	Feb. 13, 1889.	<i>XXXVIII, 454</i>
PHILLIPS, WILLIAM	F. Mar. 23, 1870.	April 14, 1874.	I, 169
PHINNEY, HENRY WARD BEECHER	M. Jan. 7, 1885.	Nov. 22, 1888.	<i>XXXVI, 563</i>
PIKE, WILLIAM ABBOT	M. Dec. 3, 1890.	Oct. 13, 1895.	XXI, 212
PLATT, JOSEPH CURTIS	M. July 2, 1895.	July 7, 1898.	.....
POE, ORLANDO M.	M. Jan. 8, 1873.	Oct. 2, 1895.	.....
POINIER, P. PORTER	J. Mar. 3, 1875.	June 11, 1876.	IV, 74
POPE, WILLARD SMITH	M. Aug. 7, 1872.	Oct. 10, 1895.	<i>XXXVI, 565</i>
PORTER, ALBERT HOWELL	{ J. July 4, 1888. A. M. July 1, 1891. }	Aug. 9, 1899.	.....

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† Date of death unknown.

# DECEASED MEMBERS P-S

Name.	Date of Election.	Date of Death.	Memoirs.*
POST, ANDREW JACKSON	M. Nov. 1, 1871.	Mar. 12, 1896.	.....
POST, JAMES CLARENCE	M. Feb. 6, 1878.	Jan. 6, 1896.	<i>XXXVI, 569</i>
POST, SIMEON S.	M. Nov. 5, 1852.	June 29, 1872.	XIX, 49
POTTS, JOSEPH DILWYN	M. Aug. 5, 1868.	Dec. 3, 1893.	XX, 49
POTTS, RICHARD	M. June 1, 1870.	July 11, 1891.	XVII, 242
PRATT, THOMAS WILLIS	{ M. Nov. 2, 1853. } { F. Nov. 4, 1870. }	July 17, 1875.	I, 332
PRENDERGAST, FRANCIS ENSOR	M. Mar. 7, 1888.	Dec. 7, 1897.	<i>XXXIX, 701</i>
PRICE, PHILIP M.	M. May 2, 1888.	Oct. 4, 1894.	XX, 200
PROSSER, THOMAS	M. Dec. 4, 1867.	Sept. 15, 1870.	<i>XXXVI, 564</i>
PROSSER, THOMAS	F. June 1, 1870.	Jan. 6, 1896.	.....
PUTNAM, JOSEPH W.	A. Mar. 3, 1880.	Mar. 24, 1893.	XX, 87
QUINLAN, GEORGE AUSTIN	M. Oct. 4, 1893.	Aug. 29, 1901.	.....
RANDOLPH, JAMES LINGAN	M. Mar. 1, 1882.	Sept. 17, 1888.	XVIII, 217
RAYMOND, THOMAS LAIDLAW	M. Oct. 6, 1897.	Nov. 15, 1901.	<i>XLIX, 354</i>
REECE, BENJAMIN	M. Mar. 2, 1881.	Dec. 17, 1901.	.....
REED, EDWARD M.	M. July 10, 1872.	Feb. 13, 1892.	XVIII, 94
REED, HENRY WADSWORTH	M. Jan. 6, 1886.	Oct. 26, 1900.	.....
REED, SAMUEL BENEDICT	M. Oct. 20, 1869.	Dec. 25, 1891.	XVIII, 183
REEVES, SAMUEL J.	M. April 5, 1868.	Dec. 15, 1878.	V, 93
REINHOLDT, KENNETH OAKE } PLUMMER {	J. Feb. 6, 1894. } A. M. Oct. 7, 1896. }	Feb. 6, 1902	<i>XLIX, 368</i>
REISEGER, MARC JOHN	M. Dec. 7, 1898.	May 26, 1900.	<i>XLV, 634</i>
RENO, JAMES HART	M. Nov. 5, 1879.	Aug. 5, 1881.	<i>XXXVII, 566</i>
RHODES, BENJAMIN	M. April 5, 1882.	Aug. 12, 1894.	XX, 163
RICE, EDWARD CURTIS	M. April 7, 1875.	April 21, 1898.	<i>XXXIX, 703</i>
RICH, WATSON WELLMAN	M. Sept. 5, 1883.	Jan. 12, 1903.	.....
RICHARDS, JOSEPH RUGGLES	A. Feb. 4, 1880.	Sept. 28, 1900.	<i>XLV, 640</i>
RINECKER, FRANCIS	M. Aug. 7, 1872.	April 10, 1899.	<i>XLII, 562</i>
ROBERTS, WILLIAM MILNOR	M. Sept. 21, 1870.	July 14, 1881.	<i>XXXVI, 531</i>
ROBINSON, MONCURE	H. M. July 6, 1853.	Nov. 10, 1891.	XVIII, 84
ROEBLING, JOHN AUGUSTUS	M. Dec. 2, 1868.	July 22, 1869.	.....
ROGERS, ALBERT BRAINERD	M. June 6, 1883.	May 4, 1889.	XVI, 98
ROGERS, FAIRMAN	M. May 7, 1873.	Aug. 22, 1900.	.....
ROGERS, JOHN BENJAMIN	M. Aug. 4, 1873.	April 1, 1874.	I, 168
ROSECRANS, WILLIAM STARKE	M. July 5, 1882.	Mar. 11, 1898.	.....
ROTHWELL, RICHARD PENNEFATHER	M. Jan. 29, 1868.	April 17, 1901.	.....
ROWE, ROBERT DELOS	M. Jan. 2, 1890.	Mar. 14, 1899.	<i>XLII, 571</i>
RUDLOFF, HENRY FREDERICK	M. Jan. 6, 1886.	June 1, 1895.	<i>XXXVI, 570</i>
RUSLING, GEORGE McCracken	M. Nov. 1, 1882.	Feb. 26, 1901.	.....
RUSSELL, NATHANIEL EDWARDS	M. Oct. 3, 1888.	Jan. 14, 1902.	<i>XLIX, 355</i>
St. JOHN, ISAAC MUNROE	M. July 14, 1871.	April 7, 1880.	<i>XXXVI, 571</i>
SCHERZER, WILLIAM	M. Sept. 5, 1888.	July 20, 1893.	XX, 78

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Name.	Date of Election.	Date of Death.	Memoirs.*
SCHOTT, CHARLES RIDGELY	M. April 1, 1874.	July 9, 1878.	IV, 128
SCHUYLER, HOWARD	M. June 7, 1882.	Dec. 3, 1883.	XXXVI, 572
SCOTT, WILLIAM LAWRENCE	F. July 7, 1870.	Sept. 19, 1891.	XVII, 285
SCOTT, WILLIAM ULYSSES	A. M. Feb. 3, 1897.	Sept. 26, 1898.	XLII, 572
SCOWDEN, THEODORE RANSOM	M. May 7, 1873.	Dec. 31, 1881.	.....
SEELY, THOMAS JENNINGS	M. Feb. 1, 1882.	Oct. 2, 1883.	XXXVI, 574
SEITZINGER, WILLIAM WHITE	J. Oct. 2, 1889.	Sept. 21, 1900.	.....
SEYMOUR, MARK TUCKER	F. July 21, 1870.	May 30, 1885.	XXXVII, 578
SHALER, IRA ALEXANDER	{ J. July 4, 1888. } { M. June 5, 1895. }	June 29, 1902.	XLIX, 357
SHELDON, SIMEON	M. Feb. 5, 1873.	Mar. 4, 1883.	.....
SHINN, WILLIAM POWELL	M. Sept. 15, 1869.	May 5, 1892.	XVIII, 123
SHREVE, SAMUEL HENRY	M. May 19, 1869.	Nov. 27, 1884.	XXXVI, 576
SICARD, MIRTILIANO	M. Jan. 4, 1882.	Mar. 17, 1896.	XL, 577
SICKELS, FREDERICK ELLSWORTH	M. Jan. 7, 1891.	Mar. 9, 1895.	XXXVI, 577
SICKELS, THEOPHILUS E.	M. Feb. 21, 1872.	Feb. 4, 1885.	XI, 130
SIDELL, WILLIAM H.	M. Dec. 1, 1852.	July 1, 1873.	I, 41
SITES, WILMON W. C.	M. Nov. 6, 1878.	Oct. 1, 1885.	XXXVI, 582
SLOAN, ROBERT INLAY	M. Oct. 1, 1884.	Mar. 3, 1901.	XLVI, 562
SMEDLEY, SAMUEL LIGHTFOOT	M. Sept. 2, 1874.	July 21, 1894.	XXI, 88
SMITH, CHARLES AUGUSTUS	M. April 7, 1880.	Feb. 2, 1884.	XI, 122
SMITH, CHARLES C.	M. July 10, 1872.	April 17, 1889.	XV, 142
SMITH, CHARLES SHALER	M. Mar. 5, 1873.	Dec. 19, 1886.	XIII, 105
SMITH, CHARLES VANDERVOORT	M. July 5, 1876.	June 30, 1884.	XI, 126
SMITH, DAVID LOWBER	M. May 4, 1887.	Oct. 10, 1893.	XX, 57
SMITH, FREDERICK HENRY	M. Feb. 21, 1872.	Dec. 24, 1898.	XLI, 643
SMITH, HAMILTON	M. Feb. 5, 1879.	July 4, 1900.	XLVI, 564
SMITH, ISAAC WILLIAMS	M. Oct. 1, 1873.	Jan. 1, 1897.	XXXVIII, 456
SMITH, LUCIUS A.	M. May 7, 1873.	Jan. 5, 1894.	XX, 48
SOSA, PEDRO JOSÉ	M. Dec. 3, 1884.	July 4, 1898.	.....
SPALDING, IRA	M. Aug. 2, 1870.	Oct. 2, 1875.	I, 338
SPIELMANN, ARTHUR	{ A. Mar. 5, 1873. } { M. Sept. 5, 1877. }	Nov. 29, 1883.	X, 115
SPÖRCK, KARL	M. Mar. 2, 1898.	June 23, 1899.	.....
STAHLBERG, ALBERT JACOB	J. Mar. 4, 1874.	Aug. 19, 1887.	XXXVI, 597
STANWOOD, JAMES HUGH	A. M. Oct. 3, 1894.	May 24, 1896.	XXXVI, 590
STARLING, WILLIAM	M. Sept. 7, 1887.	Dec. 11, 1900.	XLVI, 566
STEWART, HERBERT	A. Feb. 6, 1894.	Mar. 4, 1899.	.....
STEWART, DAVID A.	F. Nov. 7, 1872.	Dec. 14, 1888.	XIX, 160
STIXRUD, MARTINIUS	M. April 3, 1889.	Dec. 28, 1901.	.....
STONE, WATERMAN	A. Dec. 1, 1886.	Mar. 30, 1896.	XLI, 649
STRATTON, FRANKLIN ASA	M. May 3, 1876.	July 17, 1879.	V, 96
STRIEDINGER, JULIUS HERMANN	M. Feb. 2, 1876.	Sept. 28, 1894.	XX, 198
SWAN, CHARLES HERBERT	M. Mar. 16, 1870.	April 17, 1899.	XLVI, 568
SWEET, ELNATHAN	M. Nov. 6, 1878.	Jan. 27, 1903.	.....

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Name.	Date of Election.	Date of Death.	Memoirs.*
SWIFT, McREE	{ M. Nov. 6, 1852. F. Mar. 9, 1870. }	April 5, 1896.	XXXVI, 616
TAINTOR, WILLIAM NOYES	J. Sept. 3, 1895.	April 8, 1898.	XXXIX, 704
TALCOTT, COOK	M. April 15, 1868.	Jan. 12, 1893.	XIX, 99
TALCOTT, WILLIAM HUBBARD	M. Feb. 2, 1853.	Dec. 8, 1868.	XIX, 97
TALLON, JOHN JOSEPH	J. Sept. 3, 1890.	May † 1896.	.....
TASKER, CHARLES A.	J. Nov. 4, 1874.	Oct. 4, 1879.	VII, 91
TASKER, STEPHEN PASCHALL MORRIS	F. Sept. 20, 1872.	Mar. 19, 1900.	XLVI, 572
TASKER, THOMAS T., Jr.	F. Jan. 7, 1873.	Aug. 19, 1877.	.....
TEMPLE, JOHN FREDERIC	{ J. Feb. 5, 1890. A. M. Oct. 4, 1893. }	July 21, 1895.	XXI, 183
TEMPLE, ROBERT HENRY	M. May 6, 1885.	Dec. 23, 1901.	.....
THAW, WILLIAM	F. Aug. 30, 1871.	Aug. 17, 1889.	XVI, 100
THAYER, WILLIAM WATMOUGH	A. M. Dec. 2, 1891.	Mar. 14, 1893.	XIX, 94
THOMAS, ARTHUR TOWNE	M. June 6, 1894.	Oct. 10, 1900.	XLIX, 360
THOMAS, JOSEPH RUSSELL	M. Oct. 5, 1881.	Nov. 28, 1896.	XXXVII, 566
THOMPSON, JOHN CHAMBERS	M. May 18, 1870.	Jan. 17, 1880.	XXXVI, 584
THORNDIKE, JOHN LARKIN	M. May 7, 1873.	Oct. 12, 1901.	.....
TIDD, MARSHALL MARTAIN	M. Oct. 2, 1878.	Aug. 20, 1895.	XXXVII, 568
TOTTEN, JOSEPH GILBERT	H. M. Mar. 2, 1853.	April 22, 1864.	XXXVI, 525
TOUCEY, JOHN MONTGOMERY	F. May 17, 1870.	Sept. 29, 1898.	XLV, 644
TOWER, ASHLEY BEMIS	M. Oct. 3, 1894.	July 8, 1901.	XLIX, 361
TRACY, EDWARD HUNTINGTON	M. June 13, 1868.	Aug. 28, 1875.	I, 337
TRACY, JOHN F.	F. Jan. 20, 1873.	Feb. 13, 1878.	IV, 71
TRAFTON, GILMAN	M. Jan. 4, 1871.	May 25, 1887.	XV, 42
TRUESDELL, CHARLES	M. Sept. 15, 1869.	April 23, 1894.	XXXVI, 585
TYSON, HENRY	M. July 10, 1872.	Sept. 1, 1877.	IV, 110
VAN SLOOTEN, WILLIAM	M. Nov. 3, 1897.	Dec. 14, 1901.	.....
VAUGHAN, FREDERIC WILLIS	M. Feb. 17, 1869.	Oct. 19, 1887.	XV, 44
VEAZIE, JOSEPH	M. May 3, 1876.	Mar. 2, 1897.	.....
VINTON, FRANCIS LAURENS	M. Aug. 5, 1868.	Oct. 6, 1879.	VIII, 91
WAITE, CHRISTOPHER CHAMPLIN	M. Mar. 3, 1880.	Feb. 21, 1896.	XLIX, 363
WALKER, WILLIAM WILLIAMS	M. Oct. 6, 1880.	Sept. 23, 1893.	XIX, 174
WALLING, HENRY FRANCIS	M. May 6, 1868.	April 8, 1888.	XV, 140
WALTON, LOUIS ROBERTS	M. April 1, 1885.	Nov. 9, 1885.	XXXVII, 586
WARD, LEBBEUS BALDWIN	M. Mar. 16, 1870.	July 2, 1901.	.....
WARDLAW, JAMES ROBERT	M. Mar. 3, 1886.	Dec. 27, 1891.	XVIII, 96
WAY, ROBERT ATTWELL	M. June 7, 1893.	April † 1901.	.....
WEBER, CHRISTIAN PHILIPP MAX			
MARIA, BARON VON	H. M. June 2, 1880.	April 18, 1881.	VIII, 89
WEIR, FREDERIC CANDEE	M. Aug. 7, 1872.	Mar. 1, 1899.	.....

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† Precise date of death unknown.



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Name.	Date of Election.	Date of Death.	Memoirs.*
WELCH, ASHBEL	M. Aug. 7, 1872.	Sept. 25, 1882.	IX, 137
WELD, FREDERICK FLOYD	M. Sept. 3, 1884.	June 28, 1890.	XVII, 203
WELLINGTON, ARTHUR MELLEN	M. May 4, 1881.	May 16, 1895.	XXI, 199
WELLMAN, DAVID WILLARD	M. Oct. 5, 1870.	Aug. 18, 1898.	.....
WELLS, DANIEL L.	F. June 13, 1883.	Nov. 24, 1884.	XI, 132
WHEATON, EDWARD	A. Feb. 4, 1880.	Mar. 6, 1889.	.....
WHEELER, ORLANDO BELINA	M. Nov. 2, 1887.	June 3, 1896.	XXXVI, 587
WHIPPLE, SQUIRE	H. M. May 6, 1868.	Mar. 15, 1888.	XXXVI, 527
WHITE, WILLIAM HOWARD	M. Mar. 5, 1873.	Dec. 11, 1895.	XLV, 635
WHITELAW, JOHN	M. Feb. 5, 1873.	June 16, 1892.	XVIII, 191
WHITFORD, OSCAR F.	M. Dec. 6, 1871.	May 21, 1902.	XLIX, 364
WHITMAN, THOMAS JEFFERSON	M. Jan. 29, 1868.	Nov. 25, 1890.	XVIII, 103
WHITNEY, NELSON OLIVER	M. Mar. 1, 1893.	Mar. 18, 1901.	.....
WHITTON, ANDREW DEMPSTER	M. May 6, 1891.	Feb. 23, 1892.	XX, 85
WIGHTMAN, HENRY MORSE	M. April 2, 1873.	April 3, 1885.	XII, 124
WIGHTMAN, WILLARD HUMPHREY	M. Sept. 5, 1888.	Oct. 29, 1889.	XVI, 218
WILLIAMS, EDWARD HIGGINSON	M. Sept. 5, 1883.	Dec. 21, 1899.	.....
WILLIAMS, NORMAN A.	M. Feb. 17, 1869.	Oct. 12, 1879.	VIII, 92
WILLIAMS, WILLIAM	F. June 16, 1870.	Sept. 10, 1876.	.....
WILLIAMSON, WILLIAM GARNETT	M. April 4, 1883.	Aug. 2, 1898.	XLI, 645
WILSON, ARTHUR OWEN	M. Mar. 7, 1888.	Dec. 20, 1891.	XVIII, 131
WILSON, JOHN ALLSTON	M. June 7, 1876.	Jan. 19, 1896.	XXXVI, 588
WILSON, JOSEPH MILLER	M. April 2, 1873.	Nov. 24, 1902.	.....
WILSON, WILLIAM HASELL	H. M. Aug. 2, 1892.	Aug. 17, 1902.	.....
WILSON, WILLIAM WILLARD	M. Jan. 5, 1870.	Feb. 7, 1887.	XIII, 40
WOOD, ARTHUR HASTINGS	J. Mar. 31, 1891.	April 2, 1892.	XVIII, 106
WOOD, CHARLES	A. M. July 4, 1894.	Nov. 28, 1895.	XXXVI, 591
WORTHEN, WILLIAM EZRA	{ M. Dec. 4, 1867. H. M. April 4, 1893. }	April 2, 1897.	XL, 565
WORTHINGTON, HENRY R.	M. Jan. 5, 1876.	Dec. 17, 1880.	.....
WRIGHT, GEORGE FRANCIS	M. Jan. 4, 1888.	Aug. 20, 1892.	XVIII, 206
WRIGHT, HORATIO GOUVERNEUR	H. M. Mar. 3, 1890.	July 2, 1899.	XLVI, 551
WRIGHT, JOSHUA BUTLER	F. May 24, 1870.	Oct. 31, 1877.	.....
WRIGHT, WILLIAM WIERMAN	M. Mar. 3, 1875.	Mar. 9, 1882.	VIII, 119
WÜRTELE, ARTHUR SHEPPARD CAMP- BELL	M. Mar. 5, 1873.	Mar. 20, 1899.	.....
YEATMAN, HENRY CLAY	J. May 7, 1890.	Dec. 20, 1896.	XL, 579
YORKE, EDWARD	M. Nov. 1, 1882.	May 28, 1884.	XI, 124
YOUNG, HERBERT ANDREW	J. May 7, 1884.	Dec. 8, 1894.	XXI, 69
YOUNG, WILLIAM CLARK	H. M. Mar. 1, 1892.	Dec. 22, 1893.	XIX, 192

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